

286214

JPRS 84003

29 July 1983

# USSR Report

MILITARY AFFAIRS

No. 1784

AVIATSIYA I KOSMONAVTIKA

No. 12, Dec 1982

19990615 117

**FBIS**

FOREIGN BROADCAST INFORMATION SERVICE

**DISTRIBUTION STATEMENT A**  
Approved for Public Release  
Distribution Unlimited

REPRODUCED BY  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
U.S. DEPARTMENT OF COMMERCE  
SPRINGFIELD, VA. 22161

0  
63  
104

## NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [ ] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

## PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

29 July 1983

USSR REPORT  
MILITARY AFFAIRS  
No. 1784

AVIATSIYA I KOSMONAVTIKA

No. 12, December 1982

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

CONTENTS

Informational Report on the Plenum of the CPSU Central Committee (p 3) (not translated)	
Speech of Comrade Yu.V. Andropov (p 3) (not translated)	
Speech of Comrade K.U. Chernenko (p 4) (not translated)	
Col Gen Avn Batekhin on Ethnic Relations in USSR Air Force (pp 5-7) (L. Batekhin).....	1
The Starry Orbits of October (pp 8-9) (G. Titov) (not translated)	
Chronicle of the Great Life (pp 10-11) (L. Shishov) (not translated)	
Meteorological Training for Pilots (pp 12-13) (A. Golovchenko).....	7
In the Interests of Cooperation (pp 14-15) (V. Kotel'nikov) (not translated)	
Continuing the Glorious Traditions (pp 16-17) (G. Ryabokon') (not translated)	
Officer's Work With Personnel Discussed (pp 18-19) (A. Golubchik).....	12

On Those Who Are Ahead (p 19) (V. Sokolov) (not translated)	
In the Sky Over the Don (p 20) (K. Ryabov) (not translated)	
Bookshelf (p 21) (not translated)	
In Their Personalized Yak's (p 22) (B. Nalivayko) (not translated)	
They Called the Regiment Komsomol (p 23) (V. Makarov) (not translated)	
We Serve the Soviet Union! (pp 24-25) (not translated)	
Political Officer's Career Reviewed (pp 26-27) (A. Sul'yanov).....	17
Try To Solve (p 27) (not translated)	
Support For Airborne Assault Training Discussed (p 28) (V. Glezdenev).....	23
Maintenance of Mountain Air Base Discussed (p 29) (A. Malashko).....	26
Manning Requirements For Long Range Aviation Discussed (pp 30-31) (Ye. Besschetnov).....	29
Loyalty to Duty (pp 32-33) (P. Gus'kov) (not translated)	
What the Photograph Said (p 34) (I. Gusev) (not translated)	
The Commissar Led Them Into Battle (p 34) (B. Nikitin) (not translated)	
In the Fiery Ring (Conclusion) (pp 36-37) (A. Ageyev) (not translated)	
Competition and Combat Readiness (p 38) (not translated)	
Compare Your Solutions (p 39) (not translated)	
Importance of Visual Contact In Aerial Combat Stressed (pp 40-41) (A. Sigilev).....	34
Attention To Technical Documentation Stressed (pp 40-41) (G. Vishnevskiy).....	38

Estimation of Ballistic Trajectories For Achieving Orbit (pp 42-43) ...	
(O. Slavin).....	40
Foreign Aviation and Space Information (p 43) (not translated)	
Satellite Orbits Discussed (Conclusion to follow) (pp 44-45) .....	
(V. Gor'kov).....	44
Bookshelf (p 45) (not translated)	
AVIATSIYA I KOSMONAVTIKA: Annual Index--1982 (pp 46-47).....	49

COL GEN AVN BATEKHIN ON ETHNIC RELATIONS IN USSR AIR FORCE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 5-7

[Article by Col Gen Avn L. Batekhin: "The Union Indivisible"]

[Text] In December of this year, the Soviet people and all progressive humanity will note a historic date--it has been 60 years since that memorable day when a single, unified, multinational state of workers and peasants was created by the will of the peoples of our country.

The formation of the Union of Soviet Socialist Republics was a direct continuation of the work of the Great October, work which opened up a new era in the history of mankind. It was likewise a practical realization of the idea of the leader of the revolution, V. I. Lenin, regarding the voluntary union of free nations and the natural triumph of socialist internationalism. This brilliant idea was warmly supported by the working class, the laboring peasantry and the progressive intelligentsia and was embodied in the resolutions of the First All-Union Congress of Soviets on 30 December 1922. This congress adopted historic documents--the Declaration and the Agreement on the Formation of the Union of Soviet Socialist Republics. These documents formed the basis of the Soviet Constitution, developed by representatives of the RSFSR, the Ukraine, Belorussia and the Transcaucasus Federation and approved by the Second All-Union Congress of Soviets on 31 January 1924.

In the federal structure of the Soviet state, peoples great and small found the opportunity to realize their own right to self-determination and national sovereignty. There are 15 union and 20 autonomous republics, 8 autonomous oblasts and 10 okrugs located today on the enormous expanse of our motherland. All these national and state formations are represented in the highest organ of power--the Supreme Soviet.

The entire history of development of our socialist fatherland is the path of struggle and victory under the wise leadership of the Communist Party of the Soviet Union in the name of monolithic unity of those peoples who have joined together to form a new kind of state. In addition, it is the history of the rapid economic growth and the comprehensive spiritual development of the peoples who have achieved such results in all areas of creation which people in the past did not even dream of. The resolutions of the CPSU Central Committee, "On the 60th Anniversary of the Formation of the Union of Soviet Socialist Republics," notes: "We are justifiably

proud of the fact that the peoples of former national regions, previously doomed to eternal backwardness, in collective formation with workers throughout our entire country have stepped confidently into the communist future, passing by capitalism and attaining the heights of social progress."

The last 60 years have been marked by far-reaching social and economic achievements in the Country of the Soviets. In comparison with 1922, national revenues in 1981 had risen by a factor of 167. At the same time, the USSR's share of worldwide industrial production rose from 1 to 20 percent. Within the harmonious family of fraternal nations, the economy of all the Soviet socialist republics has developed dynamically. Today, each of the republics has modern industry and highly developed farming and is enjoying an unprecedented heyday in science, culture and education. At the same time, they all have their own unique national character.

Under the leadership of the Communist Party, the Soviet people have constructed a developed socialist society over the last six decades. All social relations in the country have been restructured on the basis of the collective principles internally inherent in the new order. The juridical and factual equality of all nations and nationalities was insured. A new historical community of people was formed--the Soviet people. This community is based upon the common historical fates of the Soviet peoples, profound, objective changes in their material and spiritual values and the inviolable ideological and political unity of the working class and the peasantry.

Our country's new achievements in the area of social and economic progress make it possible for the party and the Soviet people to solve the problems involved in the creation of a material and technical base for communism which continue to grow in scope and complexity. These achievements likewise make it possible to solve problems regarding the further improvement of the workers' welfare and culture, the development of social, class and national relations, the improvement of democracy and the socialist state system and the education of the new man. The party envisioned a comprehensive solution to these problems in a detailed program proposed at the 26th CPSU Congress.

As was noted at the congress, the Leninist party, while increasing the material and spiritual potential of each of the republics, is seeking further progress for the Soviet society, a strengthening of the economic and defense might of the USSR and an improvement in the welfare of the workers. The working class is the chief, decisive force behind this process. The farm laborers on the kolkhozes are striding along in step with the working class, solving at this modern stage such important economic and political problems as the overall improvement in agricultural production and in the areas of farming standards and animal husbandry. All of this was reflected in the resolutions of the May (1982) Plenum of the CPSU Central Committee and in the USSR Food Program for the period to 1990.

The contribution of our intelligentsia to the far-reaching achievements of progressive Soviet science, technology and culture is great.

An indispensable condition for the overall progress of the Soviet society is the proper party guidance of the sphere of national relations, based on the principles of Marxism-Leninism. While displaying an unflagging concern for strengthening the

inviolable friendship and unity of the peoples of the USSR, the Communist Party, its Central Committee and the Politburo of the Central Committee are creatively developing Lenin's teachings on the national question. With all its activity and its purposeful ideological and educational work, the party cultivates among the Soviet people an elevated sense of patriotism and socialist internationalism as well as pride in their great multinational motherland.

The Soviet people demonstrate a selfless dedication to the ideas of Marxism-Leninism and the deepest respect and love for their native party.

"I think that each of us communists, if asked if he would have chosen another way, would answer no. Our way is the way of truth, the way of freedom--the way of the people's happiness." You automatically recall these words of Leonid Il'ich Brezhnev, heard at the 25th CPSU Congress, when you mentally look at the path of great victories and achievements blazed by our country. Illuminated by the unfading light of the Great October and true to Lenin's ideas of internationalism, more than 100 nations and nationalities in the USSR are heading confidently toward the cherished goal--communism. History has never before known such a flight of collectivism, such an inviolable unity of interests and goals, spiritual kinship, trust and mutual assistance as our country displays today.

The international unity of the workers which arose in the crucible of revolutionary struggle was also embodied in its military organization. Since the very beginning, the Red Army of workers and peasants has been structured as an army of friendship and brotherhood among peoples, a defender of their freedom and independence.

The crushing defeat of the united forces of internal and external counter-revolution clearly showed that, for the socialist army, multinationality is one of the considerable sources of its might and invincibility and one of the basic indicators of the ideological and political stability of its ranks.

In restoring an economy destroyed by war, the Communist Party and the Soviet government have systematically and unswervingly continued to realize the Leninist principle of a national policy in state and military organization. The USSR Constitution, which was adopted in 1936 and which has secured the victory of socialism, proclaimed service in the ranks of the Armed Forces to be the honorable duty of all Soviet citizens regardless of their social origins or national or racial affiliation.

While mobilizing and inspiring the Soviet people to unprecedented feats of labor, the Communist Party has shown an unflagging concern for strengthening and developing the Armed Forces, including the Air Force, as a powerful and mobile means of combating an aggressor. The establishment of the mighty USSR Air Force has truly become a national issue.

The successful completion of the first five-year plans made it possible to fit out our Air Force with combat equipment and armaments which, at that time, were first-class. In the 1930's, the Country of the Soviets became a mighty air power. Our pilots clearly demonstrated the power of Soviet aviation and their high moral and combat qualities in the battles fought on the shores of Lake Khasan and the river Khalkhin-Gol.



The party was solving the problems of equipping the Air Force at the same time it was training military personnel who were dedicated to the business of the Great October. Our Air Force, like the Soviet Army--a new type of army--became a true military community of soldiers from all the fraternal republics, closely united around the Leninist party and boundlessly dedicated to the motherland and the great work of socialism and communism.

The multinational Soviet state and its Armed Forces endured a most difficult test during the years of the Great Patriotic War. The peoples of our country united ever closer around the party and waged an uncompromising battle against the hateful enemy. The war with the Fascist invaders and their satellites graphically demonstrated the remarkable qualities of the Soviet people: selflessness and heroism, comradely mutual aid and assistance and dedication to the work of the great Leninist party. The resolution of the CPSU Central Committee on the 60th anniversary of the formation of the USSR noted that, in the harsh war years, the brother-nations stood shoulder to shoulder in defense of the motherland, displayed mass heroism and an inflexible desire for victory, crushed the Fascist invaders and saved the peoples of the world from enslavement and destruction.

Many hundreds of thousands of sons and daughters of the united multinational Soviet family earned high state decorations for military feats in the past war.

Our glorious Air Force likewise made a worthy contribution to achievement of the great victory. From the first minutes and hours of the war, our military aviators displayed great combat skill, courage and mass heroism unprecedented in the history of wars. The winged sons of this great people boldly entered into battle with the hateful enemy forces which, at times, outnumbered them many times over. When the situation required, they took off as an airborne battering ram or brought their aircraft down upon concentrations of enemy manpower and equipment.

Forever in the peoples' memory will remain the feats of the heroes of the Great Patriotic War--N. Gastello, B. Safonov, Z. Sorokin, V. Talalikhin, S. Suprun and I. Polbin--and of many other aviators who brought glory to the motherland and to the battle colors of the Air Force. The soldiers of various nationalities fought courageously in a united winged formation. Among the 2,420 aviators who received the high title of Hero of the Soviet Union during the war years were representatives of all the union republics of our multinational motherland.

The victory of the Soviet people and their Armed Forces in the Great Patriotic War clearly showed that the Union of Soviet Socialist Republics is a viable and ideal type of multinational state which had insured the successful development of all peoples and which is the most suitable form for organizing military and political cooperation among the peoples for the defense of their revolutionary achievements.

While continuing their creative activity, the Soviet people, guided by the Leninist party, insured the rapid and comprehensive economic and political development of our country and the perfection of the socialist order in the postwar years. The establishment of developed socialism in the USSR was legislatively secured by the new Constitution adopted in 1977. In the Basic Law of our state are embodied the experience, knowledge and will of the broadest working masses. In this outstanding document of the epoch are reflected all facets of real Soviet democracy, the expansion and deepening of which is one of the most important principles in the establishment of communism.

In the international arena, the Communist Party and our national state do everything so that a worldwide fire of nuclear war fanned by the imperialists of the United States and its allies will never flare up on our planet. The Soviet Union contrasts the wise and restrained international Leninist policies for controlling the arms race to the hysterical attacks of bourgeois propaganda on the USSR and the countries of socialism. Our line is one of disarmament and strengthening of international security. We will not deviate from this line. We will increase our efforts and hold the initiative in international affairs. In his speech in the Kremlin at a conference of senior officers of the Soviet Army and Navy, Comrade L. I. Brezhnev noted that the Soviet Union is a very large socialist state and is looked at by the entire world. In addition, Leonid Il'ich stressed: "The international situation obliges us to double and triple our efforts in the struggle to preserve peace and to relax the threat of nuclear war hanging over mankind. In this struggle, we must expand our cooperation with all people to whom peace on earth is precious. We are also obligated to tirelessly strengthen our country's defenses and to maintain the highest degree of vigilance."

Considering the aggressiveness of world imperialism recently--primarily that of the United States--and the escalation of the arms race in the developed capitalist countries, our party and our people are strengthening their Armed Forces.

Air Force personnel together with the soldiers of the other branches of the Armed Forces feel a great sense of responsibility to the party and the people. With this same sense of responsibility they carry out the task of improving in every way possible the combat readiness of aviation units and subunits and successfully master the aviation equipment and weapons. Today's generation of winged defenders of the motherland who have arrived to take the place of the veterans of air battles and who have absorbed and have creatively interpreted their rich experience on the front lines continue the glorious combat traditions of the Air Force with honor and dignity.

The pilots and engineer-navigators who have received a higher military education now form the basis of flying personnel in aviation units and subunits. These are basically communists and Komsomol members with a boundless dedication to their native Communist Party, the work of Lenin and the work of communism. They persistently improve their combat skills, strengthen discipline and organization and improve the combat readiness of the units and subunits.

Soldier-representatives of all our country's nationalities and ethnic groups serve in the Air Force. Personifying the inviolable friendship of peoples, these soldiers carry out their patriotic and international duty with honor and reliably guard peace and socialism.

Commanders, political organs and party and Komsomol organizations concern themselves with the ideological tempering of these airborne troops. They strive to make the characteristics of the communist of the future the inherent characteristics of each aviator.

In the past training year in the Air Force, socialist competition for a worthy reception for the 60th anniversary of the formation of the Soviet Union has been conducted on a broad scale under the motto: "For the Peaceful Labor of the Soviet People--A Reliable Defense!" Its initiators--the aviators of the guards bomber aviation regiment commanded by Guards Col V. Sadikov--have achieved excellent results in the jubilee competition together with other military collectives.

In the days of preparation for the 60th anniversary of the formation of the USSR, many valuable undertakings directed at improving combat skills and the high-quality mastery of equipment and weaponry have begun in aviation units on this, the threshold of a new training year. Playing an important role in the increase in the aviators' activity and in their mobilization to the flawless execution of their military duty is the purposeful party-political work of the commanders, political organs and party and Komsomol organizations in an effort to clarify the resolutions of the 26th CPSU Congress and the May and November (1982) Plenums of the CPSU Central Committee, the positions and conclusions contained in the speeches of Comrade L. I. Brezhnev at the 12th Congress of USSR Trade Unions and the 19th Komsomol Congress as well as the directions of the USSR Ministry of Defense and the Commander-in-Chief of the Air Force.

Today, on the eve of the 60th anniversary of the formation of the USSR, when the practical results of the competition have become visible, Air Force personnel assure their native Communist Party, under whose wise leadership these personnel have traveled the glorious path of struggle and victory, that the soldier-aviators have entered the training year in a state of high combat readiness and that they are capable of turning away an enemy attack, no matter what the source. Any aggressor who dares to encroach upon the freedom and independence of our beloved motherland--the Union of Soviet Socialist Republics--will receive a destructive retaliatory strike.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## METEOROLOGICAL TRAINING FOR PILOTS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 12-13

[Article by Military Pilot 1st Class Lt Col A. Golovchenko: "The More Accurate the Weather Forecast..."]

[Text] At the preflight briefing, the regimental commander listened to the weather forecaster. The officer warned that a sudden deterioration of visibility was possible due to the formation of fog. The planning-table variant which had been selected for the flights was appropriate for visual meteorological conditions. After analyzing the weather forecast, the commander, instead of changing the flight planning table, decided to begin the flights a little later.

The warning of the chief of the meteorological service proved to be correct. Dense fog shrouded the airfield. The weather station soon reported, however, that the fog was dispersing. The preflight weather reconnaissance mission confirmed the forecast, and the airplanes took off. The regimental commander's skill to competently analyze the weather situation and foresee the course of events enabled the personnel to fully execute all assigned missions.

The aviators in our regiment unremittingly realize their training plans and successfully carry out their socialist obligations. They also constantly improve their combat readiness and their professional training. Sometimes we hear comments that we have been lucky with respect to the weather. Indeed, almost all planned flight shifts took place this year. This, however, is not a matter of luck, but rather of good organization of combat training.

The regimental command constantly concerns itself with improving the training process. Command seeks to derive a maximum increase in the effectiveness of each flight mission at the lowest expense. There are many ways to achieve this. The following is one of these methods. The officers on the ground-control staff carefully consider all circumstances which have an influence upon the quality of the missions to be carried out. This also includes the weather conditions. The regimental commander always sets the tone and proves through personal example that one can find a "common tongue" with regard to the weather.

It is very important that each pilot learn to competently analyze the weather situation. The pilots who fly the weather reconnaissance missions bear special responsibility for the accurate classification of weather phenomena.

One time I took off on a weather reconnaissance mission. As per the weather forecast, instrument meteorological conditions and the possibility of icing were expected. At an altitude of 300 m the aircraft entered dense clouds, the upper edge of which reached 900 m. The forecast of the synoptic meteorologist proved to be correct in all respects, with the exception of the latter item, and I thought that the flight shift could begin according to the second variant--instrument meteorological conditions. After a few minutes, however, I noticed heavy icing. I immediately reported this to the control tower. The regimental commander delayed the start of the flights for two hours.

Weather-reconnaissance pilots frequently have to carry out their assigned missions under unfavorable conditions. They are the first to take off, and their assessment of the weather conditions is sometimes a deciding factor. For this reason, we are constantly improving the system of their professional training while augmenting it with new content.

In composing training plans for weather-reconnaissance pilots, the regimental command begins with the fact that the level of training that these officers receive must be a step higher than that of the other pilots. Possessing thorough knowledge, sound skills and superior combat and moral-political qualities, the weather reconnaissance pilot must know how to fly his aircraft under any weather conditions and be able to make an accurate determination of the weather situation. Within the regiment, a great deal of attention is devoted to this very aspect of their training.

As is well known, flights under instrument meteorological conditions are carried out according to instruments, especially when there is limited visibility. This is a difficult task, even for pilots with first-class ratings. One time, having carried out the weather reconnaissance, we began to execute our prelanding maneuver. Suddenly, the needle on the radio compass which had been tuned to the far beacon began to oscillate. We, however, did not hurry to execute the turn, since this is quite a normal occurrence under conditions of atmospheric interference. We checked our turn using a stopwatch and the radio direction finder. We made a precise approach to landing.

A most important condition for a successful instrument flight is not only the trust one has in the instruments, but also the rechecking of the readings. In doing so, of course, an excessive degree of care and too much "playing it safe" cannot be tolerated. One's trust in the reliability of the flight-control and navigational equipment will be steadfast if the equipment has been carefully checked on the ground and the accuracy of its operation monitored in the air. In order to do this, one must have a thorough knowledge of the equipment and the principles of the instruments' operation, as well as sound skill in operating the various systems.

The cultivation the necessary instrument-flying skills among the aviators is set up in a number of stages. These are: theoretical knowledge, work in the simulator and flights in a hooded cockpit. Training pilots to fly using a dual set of instruments is of great importance during their psychological preparation. I will now dwell upon the airborne training the pilots receive which corresponds to the conditions under which they frequently carry out weather-reconnaissance missions.

The complexity of flights under conditions of limited visibility can be explained chiefly by the nature of the means used to perceive information regarding the posi-

tion and the displacement of the aircraft in space. There is a complex psychological process that takes place in the pilot's consciousness. As a result of the interaction of the various senses, of which vision is primary, the pilot obtains a mental picture of the aircraft's spatial position.

Practice shows that sometimes during "blind" flights there occur illusions which increase the pilot's tension. Most frequently there is disagreement between subjective sensation and the aircraft's actual position which is not visually perceived. It may seem to the pilot, for example, that the aircraft is in a banking turn. I know from personal experience that the illusion of a bank most often arises during flight in a layer of light cloud cover when the sun lies to the side of the plane's line of flight. The illusion also arises during flights in the clouds at night if the right and left sides of the cockpit are illuminated differently.

It is difficult to avoid subjective sensations in the air. One has to use will power to concentrate one's attention on maintaining the desired flight conditions. The main thing is that one must believe the instruments' readings.

One of the conditions which helps our regiment's reconnaissance pilots maintain good professional form is flights to assess the weather situation in the area of the airfield and along the flight route. The unit command draws up a flight schedule for each month. The level of training these pilots receive is constantly checked and analyzed using a flight recorder. Each oversight or error on the part of an officer is thoroughly discussed at regimental headquarters. A very exacting approach and constant attention to the weather-reconnaissance pilots yields good results. The aviators evaluate the weather situation professionally and competently and execute all assigned missions.

One can also make a judgement regarding this using another fact. In recent times, not a single one of the regiment's pilots has had to make a landing at a reserve airfield because of bad weather. The personnel have not once been caught unawares by the weather conditions. This is particularly important in the fall and winter period, when icing and sudden deteriorations of visibility most frequently occur, and there is heavy precipitation in the form of rain and snow. It is difficult to forecast such things, but not impossible, and the intensity of flight operations does not decrease in the fall and winter. The main thing here is that the weather-reconnaissance pilots not only competently assess the weather situation, but are also able to predict its development.

Flights were proceeding at "minimums." The synoptic meteorologist predicted settled weather conditions. Lt Col G. Mazin took off on the preflight weather reconnaissance mission. The officer detected a change in the atmospheric processes in the flight region. From experience he knew that dangerous meteorological conditions were developing in precisely that direction. Having analyzed the situation, the pilot informed the control tower about the deterioration of the weather. The flight control officer called off the flight shift. After 30 minutes it began to rain, and the visibility suddenly deteriorated. The accurate and timely report of the reconnaissance pilot helped to avoid difficulties.

In drawing up a weather forecast, it is very important to consider the climatic peculiarities of the region. Our airfield is located in an area of temperate climate, the weather of which can be forecast with great probability. Nevertheless,

sometimes our meteorologists encounter difficulties in developing weather reports not only for long periods of time but for shorter periods as well. It is perfectly understandable that a meteorologist who possesses a rich experience of continuous work in one of the climatic zones is able to prepare the most reliable forecast.

The regimental meteorological service is commanded by Capt M. Sorokin who came to us from a different climatic region to continue his service. This officer possesses good theoretical training and the necessary professional skills. He sometimes, however, encounters certain difficulties that have objective causes. These difficulties lie in the fact that, in drawing up a forecast, it is necessary to consider many factors that influence the weather in the immediate vicinity of the airfield, and their influence varies depending upon the season. This is where weather-reconnaissance pilots assist the ground specialists in precisely predicting the weather situation. Complete mutual understanding has been achieved between the regiment's pilots and weather forecasters.

One time, the regimental commander listened to the meteorologist before one of the flight shifts. During the course of the day they expected ten-tenths stratocumulus cloud cover. The altitude of the lower edge was to be 150 m, the upper edge 300-500 m. There was to be mist with a visibility of 4-6 km. The commander decided to conduct flight operations at raised minimums.

The weather, however, could worsen. Lt Col A. Val'kovskiy had to verify the forecast. The officer knew that fog formed in the region of the nearest high ground in the early morning hours. When the ground would warm up, the fog would flow down onto the plain, and the wind could blow it in the direction of the airfield. In the air Val'kovskiy assessed the weather conditions with a great degree of accuracy and told the control tower that the weather would not change. Thanks to the joint efforts of the meteorologists and the weather-reconnaissance pilot, the flight shift proceeded successfully.

The unit's meteorologists make a considerable contribution to improving the professional training of the flight personnel. They conduct theoretical classes with the aviators--lectures, discussions and seminars--at an advanced teaching level. For example, the pilots derived much that was useful from the lectures: "Method of Evaluating the State of the Meteorological and Ornithological Situation," "Dangerous Weather Phenomena and Methods of Evaluating Them in Flight" and others.

Gatherings organized at formation headquarters serve as an effective form for improving the training of weather-reconnaissance pilots. At these gatherings, the aviators deepen their knowledge of meteorology and study the experience of the leading pilots in evaluating synoptic processes. At the end of the gatherings, the officers take a test to be allowed to carry out such missions.

In many ways, flight safety depends upon the skill of the pilot to make a qualified assessment of the weather situation. This skill is determined not only by a thorough knowledge of meteorology. Very frequently, circumstances demand that these airborne troops be very knowledgeable about the level of professional training their colleagues have attained.

Several pilots had to carry out a bombing mission at the range. The first to take off was an experienced pilot. The weather in the designated area was not conducive

to the execution of the mission. Experience and skill helped the officer carry out the exercise with outstanding marks. Soon afterwards, aircraft flown by young pilots appeared over the range. Because of the poor visibility, however, they carried out their bombing at an altitude lower than they were capable of. This could have been avoided if the officer who had arrived at the range first had correctly assessed the weather situation and reported it to the control tower.

This episode served as a good lesson for the squadron's aviators. The quality of the professional training these airborne troops receive was improved in the collective. The necessity for the aviators to study meteorology thoroughly was confirmed conclusively by exercise "Zapad-81" in which Maj S. Vorotnikov's squadron participated. During the exercise, the flight personnel had to carry out the majority of the missions assigned to them under instrument meteorological conditions. The pilots demonstrated outstanding skill and superior combat and moral-political qualities. Skilfully analyzing the weather situation, they acted with initiative, daring and decisiveness.

At one of the stages of the exercise, Maj Vorotnikov's group was assigned the mission of destroying the command post of an enemy motorized rifle division. On that day, the weather in the combat operations area was dictated by a cyclone in which there was a prevailing low, dense cloud cover. It was complicated to carry out the bombing under such conditions. On the other hand, the pilots had the opportunity to carry out the strike from behind the clouds.

The squadron commander had thoroughly thought out the intent of the assigned mission. On the approach to the target he had to assess the weather situation quickly and accurately and, on this basis, apply the corresponding method of attack. The pilots, acting boldly and carefully, destroyed the assigned target.

This example once again confirms the fact that meteorological training plays a tremendous role in improving the aviators' professional training. Moreover, the pilots' skill to competently analyze the weather situation is an important component of flight safety and of high combat readiness.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185



#### OFFICER'S WORK WITH PERSONNEL DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 18-19

[Article by Col A. Golubchik: "The Job Obliges"]

[Text] Capt Ye. Klishin took his place in the cockpit of the fighter-bomber. After trying out the engines, he taxied out to the runway. Behind him were his wingmen. The flight leader contacted the flight control officer and asked for clearance to take off.

"You are cleared for takeoff," came the reply from the control tower.

Klishin's flight had to carry out a strike against the enemy's reserves in a designated area. The regimental commander warned the aviators that the tactical situation awaiting them was complex, and that the enemy would make use of maneuvers and camouflage. They could also expect active resistance from the enemy's deeply echeloned antiaircraft defenses.

The cloud cover was eight-tenths, and the speed at which the fighter-bombers proceeded along the flight route to the target was limited by the poor visual orientation. For this reason, Capt Klishin carefully calculated the course and followed the indications of the on-board radar-guidance system, comparing them with the calculations entered on the flight chart. He accounted for the headwind and the tailwind. Picking up speed, the fighter-bombers came upon the reference point precisely to the second. They turned onto the run-in heading.

"On the bomb run!" reported Klishin to his wingmen.

Breaking through the cloud cover, the flight commander immediately picked up the target---a concentration of enemy vehicles. He attacked on a straight-in approach. The strike was unexpected and accurate. The flight maneuvered and attacked a helicopter pad.

After the landing, the aiming-point cameras confirmed the fact that the pilots had carried out the assigned mission with a grade of "excellent."

"Well done!" said the squadron commander as he greeted Klishin. The secretary of the regiment's party committee also joined in the congratulations. The captain

could not hide his elation. He experienced great satisfaction from the flight in which his subordinates demonstrated self-restraint, composure and the will to win.

The flight commander was particularly happy with Sr Lt G. Yegorov and Sr Lt S. Yemel'yanov. Both are now training to raise their class rating. Things are going better for Yegorov, who has only to complete his test bombing.

This day was one more step toward the heights of professional mastery. The flight commander decided to support his officers' highly energetic mood, even though Sr Lt Yegorov did not precisely maintain the prescribed time interval between the aircraft. "It was only a few seconds," thought Klishin, "is it worth it to talk about it now? Would it not be better to analyze my subordinate's mistake tomorrow at the preliminary preparation?"

Nevertheless, the commander was faithful to his own rule and critiqued the flights. With a knowledge of the issues, he substantiated the causes which led to the increase in the interval between the aircraft of the second pair on the landing approach. He then addressed his subordinates:

"We dealt with the assigned mission satisfactorily, but we cannot flatter ourselves with the results we have achieved. There are still things we have to work on."

In actuality, things are proceeding normally for the aviators. Capt Klishin, however, evaluates the results of his work in a self-critical manner. When we met, he said:

"Sometimes we encounter unpleasant situations. There is an engineer-lieutenant serving in the unit. He is now an officer in good standing, and therefore I will not mention his name. Earlier, however, this officer committed a grave error. Only thanks to the vigilance of the chief of the flight's technical maintenance unit, Capt Tech Serv Butenko, were we able to identify and eliminate the error in time."

Listening to the captain, I directed my attention to the anxiety and bitterness in his voice as he recalled the vexing interruption. He had to apply a great deal of effort in order to help this young officer to acquire a sense of responsibility before the collective.

"It was necessary to work with him pretty much," continued the captain. "We acted and communicated with the squadron deputy commander for the engineer aviation service and the chief of the technical maintenance unit. We consulted with them constantly about how to cultivate in the young officer the desire to work without sparing his effort. We attained our goal."

As if to sum up the discussion regarding the engineer-lieuteneant, the flight commander noted that the integrated approach is very important in educational work with the people. He added:

"It is mandatory that we rely on the most active members of the collective, the party and the Komsomol."

It was to the commander's undeniable credit that he was able to organize spiritual contact and mutual understanding with his subordinates. It is no accident at all that these men are confidently leading in socialist competition among the flights in the regiment.

At home on Klishin's desk I saw textbooks on teaching methods and psychology alongside motion-picture and still cameras.

"In my spare time I like to make home movies and take snap-shots," explained the captain, "but I devote the greater part of my free time to self-education. My job obliges me to do this. What's more, life hurries by, it doesn't stand still. You just have to keep up with it."

Time and time again the communists have elected Capt Klishin to serve as a member of the subunit's party bureau, and many times this officer has carried out the duties of the squadron deputy commander. No matter what position he has held, he has always skilfully enlisted and organized the personnel in exemplary military work. His knowledge and accumulated life experience help him in leading people.

The flight commander believes, however, that he has been lucky with his subordinates. Explaining his "luck," Capt Klishin cited the following example.

Earlier, different pilots served in the flight. About two years ago, they had been promoted to new posts. The pilots who had come to take their place, in Klishin's opinion, were no less conscientious. They formed a harmonious and tightly knit collective. On this subject, party committee secretary Maj A. Krivosheyev says that it was not Klishin who had been lucky with his subordinates, but rather the subordinates who had been lucky with their commander.

There are numerous signs by which one can determine the talent and abilities of an officer-leader. Capt Klishin's distinguishing characteristics are his industriousness and his persistence in achieving a set goal. He always prepares himself for difficult tests. A serious examination for this officer, for example, was his participation in the "Zapad-81" exercise.

During the preflight instructions in connection with changes in the tactical situation, the regimental commander specified the mission with regard to the detection and destruction of operational-tactical missile positions far inside the enemy's defenses. As they were on their way to their aircraft, Capt Klishin reminded his subordinates:

"We will proceed in close combat formation. Remember to be cautious. Do not make radio contact unless you have to. Act only upon my command."

After taking off, the fighter-bombers assumed their course. The flight was proceeding behind the clouds. Klishin nevertheless kept the flight strictly on the assigned flight route. When they approached the search area, the commander decided to break through the clouds and pick up the missile launchers visually. Klishin was prepared for everything, but what he saw before him exceeded all his expectations. Thick smoke from the bursts of artillery shells extended over the ground. The target was down there somewhere.

In an instant, Capt Klishin made the proper decision. This decision, however, required all the commander's knowledge, skill and professional instincts. The flight destroyed the missile launchers on the first pass. Thus the aviators insured freedom to maneuver for the "North Army" reserves who had moved into the area of combat operations.

On that day, the flight still had to complete several other sorties. The airmen carried out a strike against a column of enemy tanks and provided air cover for an assault landing. Klishin's subordinates received only marks of "excellent" in executing all the missions assigned to them during the period of the exercise. As far as the result, Capt Klishin was awarded the medal "For Combat Services."

"Exercise 'Zapad-81,'" recalled the flight commander, "became for us a great school of air training. The pilots who operated under conditions that approached to as great a degree as possible those found in combat had their experience considerably enriched. Sr Lt Yegorov and Sr Lt Yemel'yanov demonstrated excellent professional training."

Klishin spoke of his subordinates with pride. The officers had been serving in the flight for only about a year, but their successes were obvious. A great deal of the merit in this belongs to the commander of the aviation subunit whose teaching abilities are valued highly in the collective.

When the new pilots arrived in the flight, Capt Klishin immediately studied carefully the service files and flight documents of these subordinates. Sr Lt Yegorov and Sr Lt Yemel'yanov had to carry out their training program for promotion to second-class rating.

Klishin conferred with the squadron commander and his deputies. A party group meeting was then held in the flight. Afterwards the pilots planned their goals in socialist competition which they committed themselves to achieving by the end of the training year.

Sr Lt Yegorov and Sr Lt Yemel'yanov took up the matter with great enthusiasm. They were given help in everything by Klishin himself and senior pilot Capt V. Shitikov. During just about every preliminary training session, the young pilots asked that a full load be planned for them.

"What eagles we have," Shitikin once remarked to Klishin. "They are being assigned few missions. They want to become aces right away."

The flight commander knew well that speed and haste in flight operations are poor allies. Here one needs to be consistent, systematic and purposeful. Without this, it is impossible to master the program of up-grade training with certainty.

I am reminded of one such instance. One time the flight commander noticed that Yegorov was not maintaining the glide path exactly. What was the problem? Klishin took off with Yegorev again in a trainer. This scene was repeated, even though at first glance the senior lieutenant acted correctly. Pondering the error of his subordinate, Klishin recalled how he himself had mastered the fighter-bomber. At the time, it did not come to him all at once, either. The flight commander was interested and asked Klishin:

"Did you used to fly on an aircraft that did not have flight and navigation instrumentation?"

Klishin nodded his head--the aircraft had not had them.

"Then," his instructor advised, "follow the horizon bar during the descent along the glide path, and things will be in order."

This experience now suggested to Klishin where he should look for the cause of Yegorov's errors. As it turned out, the senior lieutenant had not been allocating his attention properly before he passed the outer marker beacon. Thorough work had to be done. In a short period of time, the pilot polished the necessary skills for making a landing approach under instrument meteorological conditions.

I visited a preliminary training session at which Sr Lt Yegorov was preparing for a test on bombing. Klishin carefully checked his subordinate's knowledge. Although Yegorov responded correctly to all the questions put to him, the captain gave him some useful advice and recommendations. The readiness check conducted by the squadron commander showed that the senior lieutenant was completely ready for flights. The following day he accomplished the flight with a grade of "excellent" and completed his training for his second-class rating.

The flight commander works at an intense pace. He lives not only with today's but also with tomorrow's concerns. The training year is over. The flight confidently maintains its title of "excellent," and Sr Lt Yegorov and Sr Lt Yemel'yanov have commenced training for their first-class ratings. All the collective's combat-training indicators must be raised to new heights. The missions are not simple. But, as on a flight to the target, Capt Klishin's subordinates do not turn from the planned course. Such is their nature.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## POLITICAL OFFICER'S CAREER REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 26-27

[Article by Maj Gen Avn A. Sul'yanov, military pilot 1st class: "Always Among the People"]

[Text] The beginning of winter in these regions is noted for unexpected and drastic changes in the weather. Sometimes a blizzard will hit and you cannot see your hand in front of your face, while at other times, when there is no wind at all, the snow covers the roads so deeply that you cannot get through without a tractor. After a little while, however, a cold drizzling rain will suddenly wash down the road alternating with the wet snow.

Buildings flashed by in the light of the headlamps, and the vehicle entered the garrison. Wet snow covered the windshield, and the wipers had a difficult time keeping it clean.

A disturbing thought flashed through my mind: "This will just disrupt the flights. The meteorologists, however, are forecasting good weather."

On one of the turns, the shaft of light from the headlamps snatched the figure of a man from the twilight. Glancing at him, I recognized the regiment's deputy commander for the political section, Lt Col V. Baskakov.

I could not help but think, "Why is he here so early? Why, there is a lot of time before the flight shift begins."

After a minute, Baskakov told me, "I decided to look in on the airfield workers. This is what is happening. They are having a difficult time right now. The runway has to be fully ready for the flights on time. The forecasters are promising good weather."

He shook the wet snow off his hat, slammed the door and leaned against the back of a seat. He had an open face and an attentive look. Baskakov's energetic gestures spoke of his dislike for sitting around doing nothing.

I knew that things were going well in the regiment. Baskakov was one of the collective's organizers in the campaign for high indicators. One would think that there was nothing left to be done--the work had been checked out and one could be

at ease. But no, he hurries to the airfield in this kind of weather. He goes where the situation now is the most difficult. He goes to cheer up the people with a warm word and to show them by his presence how important their work is.

These thoughts warmed my heart. How good it is that people such as this are becoming political workers--composed individuals who are persistent in accomplishing their assigned tasks and who are able to listen to their subordinates and come to their aid at any moment. They are always visible, surrounded by people and constantly involved in their affairs and their concerns. And, if things are proceeding normally, they nonetheless are not content and look for something else to do to improve combat readiness and strengthen order within the subunits.

People enter aviation by different paths. Sometimes they enter by chance and, later, find it tedious. They are embarrassed to admit that they chose the wrong profession. The fact that Vladimir Baskakov became a military pilot is quite natural. His path into the air, however, was not all that simple. He finished high school and technical school, then started working at a plant. Subordinate to him were people his own age as well as older persons, wise from the experience of life and experts at their own jobs. This did not make the young man uneasy, though. Lively and active, he found a way of talking with each one on his own terms. He would go up to an experienced worker and ask:

"Andreyevich, what do you think?" He would then listen attentively, remembering the smallest of details.

After a little while, he would come back again:

"Look, if we do it this way..." Together they would think out the idea the young master had.

In getting down to the truth, he sometimes would argue himself hoarse. If the young chief saw, however, that he was wrong, he was not embarrassed to admit it. The people in the collective loved him.

Thus, in instructing others, Vladimir taught himself. He learned not only the professional subtleties, but also the way to relate to other people and the skill to respect the opinions and work of his comrades. It is possible that during this very period there arose in his nature the basic characteristics of the future deputy political officer.

At the same time, Baskakov occupied himself at the aeroclub. On the day when he first took to the air, something took place in his spirit. It was as if it split in two. On the one hand, he had already come to like his job at the plant and had prospects for a future. On the other hand, he had a feeling that he could do much more than he was doing. The sky with its fathomless blue, seeking to burst into life, opened up new and previously unknown prospects.

The chief of the headquarters of the Donets aeroclub at that time was Col (Ret) I. Golovlev. He was a front-line fighter pilot who had gone through the great school of life and who knew perfectly well how to get along with people. This experienced instructor sized up Baskakov right away. He was taken with the young man's drive, his thirst for knowledge and his irrepressible aspiration for the sky. There was one other thing--his sociability. It was impossible to imagine Vladimir alone. He was always surrounded by a circle of friends.

During the course of two years' training at the aeroclub, Golovlev never once spoke with Baskakov. When Vladimir shared his secret dream with him, Golovlev thought for a bit, then said firmly:

"You have made the right decision. Go to school, you'll amount to something."

Golovlev looked after the young man for a long time, but did not hurry the event, hoping that the young man himself would choose his course in life.

The years in school quickly flew by. The day arrived when Baskakov the graduate was awarded his officer's epaulets on the parade ground. Can one ever forget those solemn moments? He then began serving in a combat regiment. Flying came to him comparatively easy, and he found time for independent study and for meetings and work with other people. One would make errors in landing, another would make mistakes in flying. The instructors revealed and explained the causes, while Baskakov, who got outstanding marks in everything, frequently told his comrades how he worked in the air. Without boasting and with the single purpose of helping his comrades, Baskakov shared his experience and did everything so that his flight would be among the leaders.

After some time had passed, Vladimir was selected to be the secretary of the squadron's party organization. I can tell you frankly that this was a big surprise. His comrades in the party confided in everything: their joys, their failures, their personal affairs and their service matters. He was the party secretary. This title obliged him to do many things. It was as if he saw the lives of the aviators from another side. As it turned out, in addition to his job, there were dozens of such questions about which the young officer had not even suspected, and each required an answer.

Following the advice of the squadron's deputy commander for political affairs, Baskakov strove to arrange his work in such a way that no "blank spaces" remained. The deputy commander for political affairs advised him to see his goal, strive for it, struggle to achieve it and believe in the power of the people. Baskakov was told not to work in the broad sense, but to work for specifics. This is what Vladimir understood, being the secretary of the subunit's party organization.

After some time had passed, his comrades showed their great trust in him by nominating him to the Fifth All-Army Conference of Primary Party Organizations. Listening to the speeches of his colleagues and delving into the details of their work, he became convinced that political work is a struggle on behalf of the people and on behalf of the collective. How does one measure his own maturity? The speakers clarified this question as well: if the people extend their trust to you, you must work honestly and conscientiously. Otherwise, the collective will not confide in you.

This rule helped Baskakov in the future in the best possible way. Having become the deputy commander for political affairs, he came to a conclusion for himself: the party and the people have entrusted the commander and the political worker with a task of state importance--the guarantee of the unit's combat readiness to immediately carry out combat operations. Thoroughly conscious of the importance of this task, they must rally the collective and direct its efforts toward the successful completion of this task.



In order to lead people, however, one must constantly cultivate the best characteristics of the Soviet fighting man in oneself and in one's subordinates. The concept of "cultivation" includes a multitude of components which one must know. One must also apply those methods of pedagogical influence which correspond to the situation. There are no secondary issues here--all questions are of the same importance. How, let us say, is courage born? On this matter, A. S. Makarenko wrote:

"Try seriously, sincerely and ardently to set yourself the task of cultivating a courageous person. Indeed, in such a case one will not be able to limit oneself to edifying discussions. One will not be able to close the window, wrap the child with cotton and tell him about the heroic deed of Papanin." Servicemen, however, and especially the officers, are not children. These are people who already have established habits and opinions on life. For these people, the most convincing method of education is the personal example of the political worker.

The recognition of the fact that each action of the deputy commander for political affairs is followed by his subordinates helped Baskakov to always be at a high level of skill and, first and foremost, of professionalism. The political worker does not have the moral right to fly poorly. It is precisely here that his personal example plays a great educational role.

In the years of the Great Patriotic War, the flying commissars were always in the forefront. Through their example, they enticed airmen to heroic deeds. Their burning words, simple and intelligible, filled the hearts of the people with faith in victory.

Before he would tell the new arrivals about the unit's traditions, Baskakov would sometimes page through the history of the regiment. On each page stood people who defended the honor of the fatherland in the skies in those terrible years. Without bombastic words or embellishment, Vladimir Georgiyevich would introduce the young aviators to the difficult army life.

A pilot is first of all an individual. The primary goal of the deputy commander for political affairs is to form a fighting man out of this individual, a fighting man who is thoroughly convinced of the truth of the ideas of Marxism-Leninism and who is boundlessly dedicated to the work of the Communist Party and the Soviet people.

In any profession, a person has to improve himself constantly. This is Baskakov's primary task--to cultivate among his subordinates the need to improve their skills from day to day as well as a sense of responsibility for everything that they do.

One time, the chief of squadron headquarters, Maj A. Bondarenko, came to Vladimir Grigoriyevich.

"Comrade Lieutenant Colonel, I ask your advice. Some young pilots have arrived at our unit and, speaking honestly, it has always been my dream to work with young people."

Baskakov knew this officer, knew what he was capable of. If this person had the desire to work with lieutenants and the aspiration to teach them what he knew and was able to do himself, Baskakov knew that he had to assist in this matter in every way possible.

"Anatoliy Ivanovich, I support your wish."

Bondarenko's two years of work in his new job showed that his selection was correct. Baskakov never once regretted the fact that he supported the major.

Vladimir Georgiyevich did not suddenly learn to understand people unerringly and to determine precisely their moral and work qualities. He remembers how he recommended to the administration's Komsomol members that Engr-Lt A. Kovrizhkin be selected as their leader. According to testimonial data, this officer was characterized as a communist with initiative and a good organizer. In actuality, things did not turn out to be this way. For a long time, Kovrizhkin experienced difficulties in the execution of his new duties. Baskakov talked with him, taught him how to correctly establish relationships within the collective and how to select the correct direction for the work. Gradually, things were successful.

Then Vladimir Georgiyevich understood that the political worker's errors are acutely felt. For this reason, when he did make a mistake somewhere he was not afraid to recognize the error, and he put all his efforts toward keeping the consequences of his errors to a minimum.

Without a doubt, the theoretical and professional training that Baskakov received in the Military Political Academy imeni V. I. Lenin contributed in many ways to his becoming the regiment's deputy commander for political affairs. He always remembered, however, that only intense, constant work, the perfection of all one's skills and painstaking training can provide good results in one's education. Stagnation in this work cannot be permitted, otherwise one's authority can be lost. There are great demands made upon the political worker. Let us say, for example, that a person comes to him with some question. This means that, at this stage, the person considers the political worker to be most important and he waits for a positive solution. In such a case, the necessary life experience, extensive erudition and competence based on a thorough knowledge of reference documents are required of the deputy commander for political affairs.

In answering troubling questions, Baskakov tries to come up with arguments so that either the person who came to him will be satisfied or else he will be completely convinced of the objectivity of the reasons why the problems cannot be resolved. Baskakov likewise teaches this same approach to business to his subordinates.

The political worker pays particular attention to training the squadron's deputy commanders for political affairs as well as to the selection of party activists. Relying on the regiment's party political apparatus and conferring with the commanders of the subunits, Lt Col Baskakov has previously prepared officers who are capable of working with people. The principles which each of them must conform to were gradually worked out. These are, first and foremost, the desire to work, steady professional habits, communicativeness based on mutual respect, initiative in solving any problems and faultless expedition.

It is precisely these requirements which are met by Vladimir Georgiyevich's subordinates who have been nominated for the post of unit deputy commander for political affairs. Maj V. Belousov (now serving in another unit) and Capt Ye. Shcherbak successfully cope with their responsibilities in squadrons of young men. They gratefully recall Baskakov's advice. Their tutor's rule--not a step back from the collective--has become chief for them in their work.

The political worker's job is complicated. A single person is practically unable to comprehend all the urgent issues of life, service and combat training. It is this which dictates the close contact Vladimir Georgiyevich has with the party and the Komsomol active, and correctly so. It is no simple matter to control and direct its work. But, as Baskakov believes, he has been lucky. The majority of his comrades entered the unit together with him. Their years of joint service have enabled them to understand one another and to subordinate all their designs to a united goal--the training and education of the people. The "breaking-in" period is past and each political worker has found his particular area of activity and has mastered his specialty. In Baskakov's opinion, the main thing here is to daily do the common, everyday things with persistence, to do them well and to see them through to the end so that no confusion remains.

The individual is the primary objective of the political worker. Serving in the army are people of various ages with different characteristics and attitudes toward life and the service. They have their own concerns, interests and questions. Their duty before the motherland and their responsibility for its security join them as one. For this reason, the task of the political worker, in Vladimir Georgiyevich's opinion, consists of serving the common undertaking. For this he spares neither time nor effort. This is surely Baskakov's nature.

Flights took place during the shift. The meteorologists' forecast proved to be correct. Specialists from the airfield company did not let him down either. The runway was readied on time. When the aircraft taxied out for takeoff, one could not help but think that here also is a part of the work of the regimental deputy commander for political affairs.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## SUPPORT FOR AIRBORNE ASSAULT TRAINING DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
p 28

[Article by Capt V. Glezdenev: "Helicopters Land Airborne Troops"]

[Text] A group of military aviators was awarded orders and medals of the USSR for success in combat and political training. The Order of the Red Banner was conferred upon Maj N. Polyanskiy and Maj A. Surtsukov; the Order of the Red Star was conferred upon Capt A. Sadokhin, Capt A. Ibragimov, Capt I. Ul'yanovich and others. This report tells of the difficult service of helicopter crewmen and the kind of work they are doing to greet the 60th anniversary of the formation of the USSR.

The landing of airborne troops in the opposition's rear areas was planned for the early morning. The unit commander, Col V. Pavlov, accompanied the pilots on this mission. Contrary to convention, Vitaliy Yegorovich did not limit himself to just assigning the mission.

"It will not be easy," he said to his subordinates. "There will be mountains and oncoming ground fire. Be careful and disciplined. I have faith in you."

The helicopters under the command of Lt Col K. Shevelev were the first to set out for the landing areas. Behind them followed the cover group of Maj N. Polyanskiy. I know this officer well, having flown with him many times in exercises. He is sparing with words, but his actions speak eloquently for themselves. Polyanskiy always assesses the tactical situation competently, directs the battle with composure and destroys the targets with pin-point accuracy. On one occasion, his subordinate, Sr Lt V. Lisochinskiy, had a malfunction in the air. Maj Polyanskiy, immediately comprehending the situation, ordered the crew to release the bombs, turn on the fire-suppression system and land. In doing so, he gave the commands calmly and confidently. The flight concluded safely.

One time I heard the reconnaissance pilots say: "You can go out on any operation with Polyanskiy."

I thought to myself: "How good it is that they have faith in your comrade and rely on him in the most tense situation."

The helicopter pilots crossed one mountain ridge, then another. It was still a long way to the target, yet the lead pilots reminded their wingmen: "Be alert!" In the mountains, where the air is very dusty, there is minimum visibility and one must maintain particular composure in order to avoid colliding with the mountain peaks or coming under enemy fire from the antiaircraft weapons positioned in the hills.

The machine guns of the airborne troops bristled in the opened windows of the helicopters. This was prompted by previous experience in conducting battles in the mountains. As soon as a gunner would notice a strike target on the ground, he would indicate to the crews the location of the target using tracer rounds.

The bed of a dried-up stream appeared below. That was the site for setting down the helicopters and landing the motorized riflemen. The doors were opened wide and the weapons readied. A helicopter from the lead group was landing when ground "fire" directed at the rotary-wing craft intensified. What were they to do? There was no other suitable landing site in that area. Lt Col K. Shevelev, Maj Yu. Grudinkin, Capt A. Sadokhin and Capt V. Kuz'minov did not lose their composure. Having assessed the situation, they acted like front-line troops: they landed their combat craft through the curtain of "fire" in the area where it was necessary to gain a victory.

At the same time, Maj Polyanskiy led his group in destroying the opposition's anti-aircraft defenses. They made pass after pass on the target. It was difficult for the crews--the steep cliff ridges did not allow them to turn properly. Moreover, the mountains descended in an overhanging ridge which provided reliable cover for the enemy's anti-aircraft gun position. Polyanskiy decided to strafe it from two sides.

Meanwhile, the other group of helicopters continued to land troops. By this time, Maj A. Khaybrakhmanov and Capt N. Korol'shchuk had already set down their rotary-wing craft. Having landed, the motorized riflemen expanded the airhead in rushes and crowded the enemy against the mountain. The enemy brought fresh troops into the battle, and the intensity mounted. The opposition opened fire from a second anti-aircraft machine gun. The trees off to the side, however, hindered the gunner. Taking advantage of such a situation, Capt Korol'shchuk decided to keep one side of his helicopter close to the trees and, taking cover from them, escape the danger zone.

One more helicopter appeared in the sky. It was the unit commander, Col V. Pavlov, coming in for a landing. He was personally assuming control of the operation. Maintaining a strictly determined formation, some crews were attacking while others continued to land motorized riflemen. They rendered assistance to those troops who landed first to capture the airhead. Maj A. Surtsukov, one of the best masters of flying in the mountains, picked up the "wounded" right from under the enemy's nose and quickly shot upwards.

The motorized riflemen's area of operations grew. The helicopter crews provided them with simultaneous fire support. Everywhere there was a feeling that the opposition was noticeably reducing its combat activity.

Before they saw service in these areas, these pilots had had some experience in co-operating with other arms of the service. Here, however, in the mountainous desert region, this experience clearly proved to be insufficient. For this reason, the squadron commanders and their deputies devoted particular attention to the study

of tactics and specific features of the interaction with motorized rifle and airborne assault units in the mountains. The political workers organized several meetings with representatives of other arms of service. Many helicopter crew commanders were acquainted with the the commanders of the platoons and companies and were friends with them. Today they were actively cooperating and understanding one another in mid-word. The sense of military fraternity bequeathed by our front-line troops to today's generation of defenders of the motherland is growing stronger.

The mountains had an effect on the character of many of the aviators and forced them to deal with many things in different ways. Although there were some who had previously earned high class ratings without training very assiduously, they now had to do some solid work on extending their knowledge and perfecting their skills, for the mountains only recognize skill of the highest standard. Today this skill was being tested for its soundness.

I remember when Sr Lt Viktor Shaymordanov was being certified. He was not always successful in his first flights--the mountains affected his psyche. Majors Polyanskiy, Lugovskov and Kostin took the young officer under their patronage and flew with him in a pair several times. Even Lt Col Shevelev took him on as copilot. After a little while, Sr Lt Shaymordanov also solidly mastered flying in the mountainous desert region. Now he is one of the experienced helicopter pilots and has been awarded the Order of the Red Star. The transference of experience to the young aviators and the concern for their rapid certification is one of the unit's best traditions.

The enemy was no longer able to put up any opposition. They were going off into the mountains in small groups. The helicopter crews, having carried out their mission, assumed a course back to their airfield.

Thus concluded one more difficult day of intensive training, and tomorrow the pilots would again have to take off to interact with infantry subunits.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## MAINTENANCE OF MOUNTAIN AIR BASE DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
p 29

[Article by Capt A. Malashko: "The Airplanes Are Based in the Mountains"]

[Text] The challenging climatic conditions in our part of the world create many difficulties for aviation specialists. Sometimes the wind carries a great deal of dust and pebbles to our airfield high in the mountains. The personnel of the engineer aviation service where Engr-Maj A. Zolotukhin serves as aviation equipment engineer maintain a particularly vigilant watch so that foreign objects do not find their way into the cockpits or air intakes of the aircraft and put them out of commission.

The snowcaps on the mountain tops and the rather cool nights remind one of the fact that it will soon be winter. With the onset of winter, the operating conditions for the supersonic aircraft will become even more complex. The abundance of rainy days and the dust storms have a negative effect on the equipment, and for this reason the personnel of the engineer aviation service must strive to prepare for wintertime operations in an excellent manner.

Questions regarding the further improvement of service equipment are frequently discussed at meetings and conferences. The regimental commander, political workers and supervisors from the engineer aviation service often speak at these assemblies. During the drills supervised by Ye. Prasolov and S. Dudakov and others--officers and specialists with high ratings--the aviators work out methods of protecting the air intakes, inspecting the cockpit glazing, removing accumulated moisture in hard-to-reach places in the aircraft's structure and detecting and eliminating malfunctions.

This all has great significance for the successful operation of the equipment at the mountain airfield. In the past, we had some young specialists who did not take certain peculiarities into consideration and made mistakes. Naturally, this created additional difficulties for the flying personnel in the execution of their flight missions.

Today, such facts are the exception in our regiment. Having studied the experience acquired in the operation of equipment in the high mountain region, the aviators place their missile-carrying aircraft in such a way as to protect them from the gusty winds and other surprises of nature.

The work of the technicians and mechanics in the technical maintenance unit has its peculiar features as well. Indeed, they frequently have to carry out periodic maintenance and renovation operations at outdoor maintenance sites, in the cold rain and at night. It is particularly difficult for them during tactical flight training periods. In order to successfully utilize the various equipment, monitoring instruments and the ground equipment, the personnel of the technical maintenance unit have to possess high qualifications and professional skills.

The specialists from the technical maintenance unit systematically obtain excellent results in military training and competition for a worthy greeting for the 60th anniversary of the formation of the USSR. Judging by everything, one can sense that they do not intend to surrender the goals they have attained. Engr-Maj V. Kotsepuk, Capt Tech Serv I. Slin'ko, Sr Lt Tech Serv V. Strelkov and other officers are already now teaching their subordinates how to carry out maintenance operations in a complex environment and caution them against mistakes and oversights.

One time, an aircraft and engine mechanic, Pvt N. Korobeynikov, was substituting for one of his comrades and was working on the air system. The soldier incorrectly installed the coupling nuts in a place that was difficult to access and was trying to eliminate the air leak with sealing paste.

In order that mistakes of a similar nature are not repeated, supervisors from the engineer aviation service are conducting special classes. We can tell you that the training of groups of limited size and the work of technicians and mechanics from related fields is having a great effect. Before the start of the fall-winter period, classes are organized for the young soldiers in which the reasons for equipment malfunctions and failures caused by personnel are explained. The soldiers are reminded of measures for preventing malfunctions and accidents.

Last winter there were frequent heavy snowfalls and ice storms at the mountain airfield. While servicing the equipment, the soldiers learned how to heat the premises using engine heaters and other means of heating. The party and Komsomol activists are now disseminating the accumulated experience at discussions with specialists, in wall newspapers, in visual propaganda materials and at meetings. Spot checks are being conducted in an effort to check the preparation and storage of heating equipment and to fit out this equipment with the necessary spare parts and expendable materials.

Supervisors from the engineer aviation service have tried to make sure that literally every officer and warrant officer knows how to use the engine heaters competently and effectively. They have also trained them to eliminate problems in the hard-to-access portions of the aircraft, to light these areas and to heat them when carrying out operations.

The activists have summed up and propagated the experience of one of the best master maintenance men, Warrant Officer G. Forrer. During tactical flight training in a heavy snowfall and out in the wind, he managed to repair six "damaged" aircraft in a matter of hours.

The technicians and mechanics from the group headed by Capt Tech Serv G. Yudin which carries out periodic maintenance on aircraft weapons puts up a reliable defense against defects. This collective has been leading for a long time in the competi-



tion among periodic-maintenance groups. These aviation specialists have successfully fulfilled the commitments they have taken on for the year. They have submitted several valuable efficiency proposals, thanks to which we have managed to considerably reduce labor expenditures and improve conditions for the storage and utilization of removable on-board weapons and ammunition during dispersed basing of the aircraft.

Some of the proposals have made it possible to increase the labor productivity of the aviation specialists for instrument equipment who have to use a great many indicators and complex equipment in which aneroid membranes are employed. Their indications can vary considerably depending upon changes in the atmospheric pressure, and in the mountains such phenomena are not uncommon. The leading aviators have analyzed and summarized their observations and have developed a method for additional instrument checks. They have also prepared new correction tables. This has made it possible to improve the quality of instrument equipment preparation and to avoid the inaccurate correspondence of the instrument readings.

Every mistake that entails the malfunction of an instrument or an accident is immediately analyzed in detail in the collective. The primary efforts of the regimental commander, the political workers, the officers of the engineer aviation service and the party and Komsomol organizations, however, are directed toward preventing mistakes. They explain to the people the difficulties of work under mountain conditions and stress the responsibility for the defense of our country's southern borders which has been entrusted to them. The supervisors of the engineer aviation service aim for model behaviour from the soldiers in their work as well as efficacy in socialist competition.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CS0: 9144/0185

## MANNING REQUIREMENTS FOR LONG RANGE AVIATION DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 30-31

[Interview with Col N. Glazunov, Honored Military Navigator of the USSR, by Col Ye. Besschetnov: "Psychological Crew Compatability"; date and place of interview not given]

[Text] The new training year has commenced at Air Force units and subunits. The aviators are assigned complex and demanding tasks for further improving their vigilance and combat readiness and for perfecting their military skills. The successful execution of these tasks depends upon many factors, including the proper and scientifically based composition of the flight crews.

AVIATSIYA I KOSMONAVTIKA correspondent Col Ye. Besschetnov asked Honored Military Navigator of the USSR Col N. Glazunov to answer questions associated with the specifics involved in forming crews for multiseat combat aircraft.

[Question] There exists a concept of "psychological compatability." In your opinion, Nikolay Lavrovich, what does this consist of as applied to crews of long-range bombers?

[Answer] The crews of our aircraft frequently fly on automatic pilot for several hours running, and for much longer periods of time with in-flight refueling of the aircraft. Our aviators experience tremendous physical and psychological pressures and, naturally, become fatigued. This is fertile ground for the appearance of irritation, lack of self-control and even mistakes. How important it is to be able to withstand difficulties, get along with one another, render timely mutual aid and assistance and to spare the nerves and feelings of one's colleagues! To begin with, this is possible providing that the crew is made up of persons whose professional and personal qualities meet the high requirements of modern warfare and who provide the best combination necessary for fruitful work in any situation, even the most complex. This being the case, it is very important, and I would even say essential, that each crew member thoroughly knows the tasks put before the collective and directs all his efforts toward their precise and absolute solution. In this, perhaps, lies the essence of psychological compatability. Its indispensable components are a high degree of unity among the flight crew, mutual understanding among its members and, of course, a low degree of conflict. If one manages to achieve this, one can be assured that success is guaranteed.

The outstanding crew of one detachment commander, communist Maj Krasil'nikov, has over the course of an extended period of time had high overall marks and can serve as an example. Krasil'nikov is a military pilot 1st class, and the aircraft's navigator likewise has his first-class rating. The aircraft's second officer as well as the assistant navigator and the rest of the crew have sufficiently good training. They are thoroughly prepared for the flights and carry out their missions with a high degree of quality. Playing an important role in this is the strong combat unity of the crew members and their ability to understand and support one another in difficult moments.

I can recall one such case. After many hours of flight on the way to the range, the crew was returning to the airfield. A strong headwind at flight altitude introduced adjustments to the calculated data. When the bomber approached the base, the fuel remainder precluded a repeat landing approach. Instrument flight rules were in effect. Make a mistake on approaching the airfield, and it would be impossible to correct it. One would think that the crew would have serious grounds for nervousness and worry. Nothing of the sort, however, was observed. Maj Krasil'nikov and the aircraft navigator, Capt Skorikov, correctly evaluated the situation, quickly carried out the additional calculations and coordinated their actions with the control tower. Their composure and self-control were transmitted to the other crew members. Each crew member carried out his duties accurately and confidently, and the flight concluded safely.

The aircraft commander and his navigator have been working together for five years, the other crew members for a little less than that. I can tell you frankly that this is not a short period of time if you consider the natural transfers of people in the service. Total mutual understanding is observed among the crew members, and healthy moral relationships have been established. Maj Krasil'nikov is strict and demanding, but fair, and sets the tone in everything. As the commander, he is concerned that his subordinates respect one another and do not permit rude nor tactless behavior. He is able to nip in the bud any conflict that forms and to resolve arguments and misunderstandings that arise without unnecessarily provoking passions.

Such close-knit and friendly crews comprise the majority. Their experience once again confirms the immutable truth: for success, it is not enough that the people only possess good individual training. It is no less important that they are able to work with one another in a combat collective so that their professional and personal qualities provide an optimum combination for the attainment of a single goal.

Today's multiseat aircraft are very complex systems, and overall success depends to a great degree upon every crew member. For this reason, it is important to concern oneself with insuring the best combination of quality characteristics on the part of the crew members, with achieving harmony in their mutual relations and with putting together a stable group capable of successfully carrying out the missions assigned to them.

[Question] Based on your own experience, what could you say about the specifics involved in composing crews for multiseat aircraft, considering their psychological compatibility?

[Answer] The question is not simple. As you well know, there are as many unique and distinctive natures as there are people. In every case, a special approach is required toward each, especially when forming a crew, when it is necessary to not only to predict hypothetical relationships, but also to anticipate the probable direction of their development.

Commanders, political workers, deputy commanders, unit and subunit headquarters commanders, unit navigators and others frequently participate in various transfers of people and in the formation of new crews. As a rule, these officials begin with the fact that the mutual relations in newly formed "closed" collectives are a very subtle and delicate matter which deeply touches the peoples' interests and feelings. Here sensitivity toward each person, a thoughtful approach to the solution to this question and thorough consideration of its psychological, moral and professional features are especially necessary. When selecting people for our crews, they consider the education of this and that pilot and navigator, their class ratings, their length of flying service as well as their moral-political and psychological preparation and their cast of character.

I remember once how some young replacements arrived at our unit--pilots and navigators who had just recently been graduated from military flight schools. How were we to divide them into crews? Before resolving this issue, the commander, his deputy commander for political affairs, the senior navigator and headquarters officers acquainted themselves with each man's file, paying particular attention to the content of the recommendations made at graduation. They then spoke with each young officer and determined his level of knowledge, his individual tendencies and his interests and aspirations. Having gathered together, they exchanged their opinions. This enabled them to formulate a more precise idea about each of the arrivals, their capabilities, their level of training and the features of their characters. They also talked with the aircraft commanders and navigators whose crews were supposed to receive replacements and determined their desires. Based on this, the young officers were included in the crews. Intensive training began. I have to note that the majority of these green troops are successfully improving their combat skills without interruption. Many of them have become outstanding officers.

Most frequently we form crews according to the following principle: a young navigator is assigned to a trained aircraft commander. Such an approach to business is more justified, since it requires a lesser expenditure of time and effort to insure a high level of combat readiness. In fact, a crew led by an experienced and all-round trained commander carries out flights day and night and under visual and instrument meteorological conditions in order to learn flying skills and combat application. Favorable conditions are created for the aircraft navigator to achieve the necessary level of training. Practice shows that he, as a rule, requires only a few months to become a complete crew member.

In certain cases, we make up a crew entirely of young flyers. True, in this case, the time taken to train these aviators is somewhat protracted. To shorten it somewhat, we try to select a sufficiently experienced second officer for the aircraft commander and an assistant navigator who knows his business for the young navigator. This is what we did, for example, when we selected the crew now led by Capt Nestrenko. The aircraft commander appointed to the current position before the beginning of the past training year and his navigator, Capt Volkov, who at the time

was recommended for promotion, did not have the necessary experience. In order to strengthen the crew, Sr Lt Il'minskiy was included here as the assistant navigator. He had flown many years on bombers of this type and had good training. In accordance with the combat training program, the crew was trained day and night in combat application. These people made a good showing. The collective proved to be very tightknit and efficient. It was not necessary to change the crew's composition, and it was retained. Now these aviators are training to operate in combat group formations. If some troubles were to be detected in the crew's work or discrepancies in their mutual relations, command, as it sometimes happens, would make the necessary transfers.

Sometimes life forces us to resort to another principle: the aircraft commander is young, and the navigator is trained. For example, Capt Mayunov, who at that time had his first-class rating, was assigned to Capt Merkulov, pilot 2nd class, as the aircraft navigator. Such a formation, I will tell you bluntly, had been made necessary. Well, what came of it? The aircraft commander has subsequently begun to master his training program and only later will make the transition to carrying out flights in combat operations. Thus, the navigator essentially flies "idle" for a prolonged period of time without being engaged in combat operations. As a result, he loses part of his training. It would not be unusual if he, not having accumulated the necessary flight time in combat operations under complex conditions day and night, would not be awarded his first-class rating.

As we can see, the formation of crews is not some kind of mechanical transfer of people. Who comes here and who goes there is a complex and multifaceted process which requires the consideration of not only the people's individual characteristics, but also a variety of factors associated with insuring a high degree of combat readiness and the effective training and education of airborne troops together with the strengthening of order and organization within the collective.

I have to say that we do not always manage to deal well with this. There are vexing miscalculations. The composition of individual crews has to be changed for various reasons, including psychological incompatibility.

[Question] One way or another, the crew is formed. What, in your opinion, is necessary from the point of view of psychological compatibility so that the crew will excel with respect to its degree of unity, coordination and combat effectiveness?

[Answer] Our observations show that temperament most frequently "fit together" for specific reasons. In a number of cases, people with different temperament get along quite well. Significant in this respect is cooperation between the aircraft navigator, Capt Trubnikov, a composed, unflappable and even excessively steady individual, with the assistant navigator, Sr Lt Druzhinin, by nature quick and agile. During flight, it is as if they mutually complement one another. Trubnikov's slowness to action keeps his combat assistant from hasty actions, while Druzhinin's rapidity and energy in his work do not allow the aircraft's navigator to drag things out when making a decision or carrying out the necessary calculations. In the end, their mutual influence gives good results. They receive high marks for air navigation and bombing.

It is difficult to fully assess the emotional and volitional qualities of this or that pilot or navigator. One meets people who by nature have inherently negative characteristics such as, let us say, irascibility and mental imbalance. One

would think that, knowing the person, everything would be clear, but this is not the way things are. One person will be able to control himself at the necessary moment, suppress feelings running high through will power and force himself to act in a composed manner. Under the same conditions, another person possessing the same characteristics will lose control of himself, will allow hasty and nervous actions and will commit unforgivable mistakes. It is difficult to foresee how a person will behave in a situation that has become complex. One must have experience and be able to understand well the psychology of people in order to prevent negative influences. It is important that the aircraft commander, his second officer, the aircraft navigator and his assistant, different with respect to their natures, mutually complement one another.

Practice shows that it is expedient to maintain the composition of a successfully assembled crew for a long period of time whenever possible. It requires a long time indeed for crew members to work well together and to get "broken in." Coordination in their actions has a considerable influence upon the maintenance of the moral and psychological atmosphere within the crew necessary for successful work.

Psychological compatibility is high in those crews where the people excel in political consciousness and ideological conviction and strive for the faultless execution of their duty. In carrying out educational work, we pay particular attention to the development of these qualities in our airborne troops. Indeed, the ideological kinship and aspiration for the same moral and aesthetic values bring the people closer together. This is dictated primarily by the fact that the group or collective efforts are directed toward the solution of wide-ranging and common, not personal, problems which require the subordination of personal interests to the interests of the collective.

Concerning themselves with insuring psychological compatibility in flight crews, the commanders and political workers consider this and systematically cultivate the aviators' collective qualities. Much attention is devoted to forming in these people the skills for efficient joint action, particularly in the process of combat application of aviation equipment.

The creation of a positive psychological climate within the collective and the attainment of success in combat training depends to a great degree upon the commanders and their skill to work with people and to correctly establish mutual relations with them. Fussing and a lack of self-control on the part of the commander and a lack of confidence in his own decisions have a negative impact on his authority. For this reason, the insurance of a high degree of psychological compatibility in flight crews cannot be successful if one does not carry out persistent and systematic work with the commanders to improve their instructional skills.

[Text] In conclusion, Col N. Glazunov said:

"Coordination in the actions of the crew members, their close-knit nature and each man's thorough understanding of his purpose are an important prerequisite for the achievement of superior results in competition for combat mastery. We must more fully utilize progressive experience to create a businesslike atmosphere in the collective and an environment of high efficiency."

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## IMPORTANCE OF VISUAL CONTACT IN AERIAL COMBAT STRESSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 40-41

[Article by Guards Capt A. Sigilev, flight commander and military pilot 1st class:  
"Training Aggressiveness in Combat"]

[Text] Our pair took off to intercept the enemy. Executing the commands of the GCI [ground-controlled intercept] controller, we arrived at the designated area and soon acquired the target on the screens of our on-board radar sights. The target was maneuvering vigorously with respect to course, altitude and speed. At the final approach phase, the situation could not be considered to be within the calculated attack parameters. I thought to myself: "All is not lost. Nosyrev is approaching the permissible fire zone, and..." I knew that my wingman saw the target and, in order to complete the intercept, he would have to act independently once he had warned me off the target.

My wingman began the attack, but soon broke it off. Exploiting our mistake, the enemy aircraft broke away from us. Our attempts to overtake him were to no avail, and we returned to our airfield.

"Why did you break off the attack?" I asked Nosyrev during the flight critique.

"When I began the attack," replied the captain, "I lost sight of your aircraft."

It was later discovered that, having lost visual contact with the lead aircraft, the pilot complied with safety requirements and broke off the attack. We did not accomplish the training mission.

At the same time, the flight commenced practicing a complicated type of combat tactic. The pilots found the new exercises to be difficult. Guards Captains V. Taran and Yu. Nosyrev and Guards Sr Lt Ye. Popuga allowed deviations. This once again confirmed the fact that fighting men with first-class ratings (and all three of my subordinates had such a rating) are not immune from mistakes. Of course, I, the flight commander, was to blame for everything.

This flight with Nosyrev caused me to reflect on a lot of things. The squadron commander and other experienced instructor-specialists gave me valuable advice. One conclusion inevitably arose: we had to develop our upcoming missions in greater de-

tail and provide for the maximum possible number of variants in the process of modeling the missions. At the same time, we had to always remember the psychological training of the pilots for a specific mission.

It was these mistakes allowed by me during such training that had become the primary reason behind the disruption of the intercept flight. Had I related to my subordinates something instructive from my personal experience in time, everything probably would have turned out differently.

I decided to correct the situation immediately. On the day of preliminary training for the next flight shift, I told the pilots about one such episode.

It was at the beginning of my service as an officer. At that time I had occasion to fly as wingman for an experienced flight commander. On one occasion we were intercepting an airborne target. The situation which had taken shape forced the lead aircraft to reduce speed while maneuvering at the moment of attack. I precisely maintained the calculated combat-formation parameters. I admit that, having noticed the changes in attitude of the fighter flying up ahead, I felt myself at a loss for a moment. For the first few seconds, I wanted to repeat the commander's actions. I refrained from this, however, and began the attack independently and informed the lead aircraft of this.

I remembered that the grade for the execution of the mission is given to the pair. The target was destroyed, and the visual contact that had been temporarily lost was restored. We received high marks for the intercept, and safety measures had not been violated. The flight commanded praised me for my independent action and resourcefulness.

This story, of course, accompanied by a graphic depiction of the intercept and the maneuvering of the aircraft in aerial combat helped my subordinates in many ways and reminded them of the necessity to be psychologically prepared for skilful actions which display initiative in an unexpectedly complicated environment. It would be wrong to say, however, that our discussions alone resolved the issue. The thoroughly thought-out and systematically and accurately organized advance and preliminary training for complex types of combat application were the chief determining factor in the flight's pilots being able to carry out subsequent missions successfully.

I will digress somewhat. For a long time, the article by Col V. Belyayev, "A Pair or a Single Aircraft?" (AVIATSIYA I KOSMONAVTIKA, 1981, No 11), was discussed on the pages of this magazine. With great interest, our pilots followed the course of the discussion and expressed their opinions every time something appeared in print. I personally was in favor of the pair--I am firmly convinced that in a combat environment it will be the pair that carries out the mission with the greatest benefit for the attainment of overall victory. This, however, is just a personal observation. Below is the reason why I recalled the article by Col V. Belyayev.

Today's fighter aircraft are greatly superior to their predecessors with respect to all technical and combat capabilities. The tactics and methods of their combat application have changed. It is quite understandable that the concept of visual contact between the leader and his wingman has changed as well. Modern, maneuvering group aerial combat, as well as single combat, is based on precise mathematical calculations. They show that a momentary break in visual contact between pilots who have good training and who faithfully observe flight-duty regulations and established safety measures does not harm matters.



In training and educating my subordinates, I have tried to get them to thoroughly familiarize themselves with this fact and to acquire the necessary skills and confidence in their own strengths and abilities. As experience shows, the careful modeling of each mission and its detailed simulation makes it possible to achieve the objective more quickly. This is what we have done and continue to do. The modeling and simulation of aerial combat, however, can be done in various ways.

It is a good thing, for example, when the leader and the wingman have precise mathematical calculations that substantiate the execution of this or that maneuver with various banks and G-loads. It is even better, however, if, having them, they possess a clear conception of what to do at a particular phase of combat if the situation changes.

Let us assume that the aircraft have to separate in order to force their will upon the enemy. At what point in the maneuver should the pilots re-establish visual contact when it has been lost in a previous phase? How is one to foresee the moment when visual contact with the wingman is lost in the situation which is taking shape, and how can one calculate the necessary flight parameters for the subsequent restoration of the desired combat formation. Where will one orient the commander's aircraft at the conclusion of the maneuver--in the front of the canopy or off to the side? During classroom lessons, cockpit drills in the fighters and "walk-through" simulations, these and similar problems force the officers to not just listen to the flight commander's explanations, but to think creatively and to take an active part in aerial-combat training. The solution of the hypothetical exercise situations teaches independence and the skill to select from the stream of information received that which is most valuable and necessary at the given moment.

Every time we model and simulate a tactic that we have conceived, we discuss it in detail and specify the safety measures. We devote particular attention to the exercise of proper discretion during the execution of advanced flight maneuvers and combat maneuvers in pairs. A thorough knowledge of these matters is a reliable guarantee against the appearance of potential accident causes and considerably increases the safety and the quality of the flights.

The commander's consideration of the individual characteristics of his subordinates and their weak and strong points contribute to the acquisition and strengthening of the skills needed under the complex conditions encountered during group aerial combat operations, as well as to the development of the pilots' faith in their own powers. It will suffice to refer to the following fact.

Guards Sr Lt Popuga worked out his combat-maneuvering exercises excellently. The results he achieved later, however, got worse. Why? The squadron commander and his deputy helped to find the answer. They advised me to direct my attention to my subordinate's temperament.

Indeed, during an in-depth analysis of the unsuccessful flights, we established the following fact: the cause of a number of Guards Sr Lt Popuga's characteristic errors was excessively hasty and aggressive actions in the air. Drawn into combat, the pilot began to hurry. This led to his being unable to maintain the calculated parameters and to a disruption of the tactical single-combat plan previously prepared on the ground, especially in the absence of visual contact with the lead aircraft.

We corrected the matter. First of all, we refreshed his memory again regarding theoretical issues from the corresponding chapters of aerodynamics, tactics and pilot instruction. During the preliminary preparation for the flights and during their analysis, we scrupulously and diligently simulated all the missions while accompanying the discussions with graphic depictions of the combat engagements and with calculations. During simulations using the "walk-through" method, we devoted attention to an analysis of the situation, the adoption of solutions, radio exchanges and the necessary actions.

The lessons and drills had the expected effect. Guards Sr Lt Popuga acquired confidence. The precise calculations and reliable mastery on the ground of everything that would be required in the air tempered the pilot psychologically. He is no longer worried about losing visual contact with the commander and, subsequently, with the lead pair when engaged in combat as part of a flight. I must mention that Guards Capt Nosyrev and Guards Capt Taran also acquired much for themselves from this training. In subsequent combat-tactics flights, they acted confidently, decisively and with initiative.

"Learn To Destroy Airborne and Ground-Based Targets with the First Attack, the First Rocket, the First Bomb or the First Machine Gun Burst"--such is the motto of our flight's personnel. We have achieved definite success. Before us lie new and more difficult problems. Their solution will require a great deal of work, including the cultivation among the soldiers of the kind of fighter's aggressiveness which will guarantee both high-quality mission execution and proper flight safety.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## ATTENTION TO TECHNICAL DOCUMENTATION STRESSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 40-41

[Article by Col (Res) G. Vishnevskiy: "He Did Not Heed the Warning"]

[Text] 'Mistakes and potential air-accident causes, as a rule, occasionally crop up and the officers in charge are to blame. Extremely dangerous, for example, are the actions of those individuals who, despite their knowledge of the requirements of the basic documents, nevertheless deviate from the strict execution of these documents and allow themselves a so-called "personal margin." I recall an old, but very instructive incident.

Several pilots from our unit were falling behind in their preparation for their rating examinations. Having chosen suitable weather conditions, we organized the specific flights. The flight-planning table provided for each crew to take off on a bomber assigned to them with a specific load of fuel. At first this condition was strictly carried out. Later, however, the flight control officer, A. Gaydakov, asked the crews in the air about their fuel remainders and gave the command that new pilots would be transferred to the bombers without refueling. Soon afterwards, two crews with inspectors on board departed on a mission. After the pilots were checked out and before the landing approach was begun, there came over the radio an alarming report from the flight control officer:

"The antennas are covered with ice. We see your aircraft poorly."

The crew in front of us making its landing approach reported:

"We are at altitude over the near beacon and do not see the runway. The aircraft is icing heavily."

The aircraft went around again.

Having turned on our anti-icing equipment, we descended precisely along the glide path. The near beacon passed by. Our altitude was already 60 m. Instead of the runway lights and floodlights, we saw a hazy, white spot. We also decided to go around again.

The bombers' fuel remainders would not permit them to land at an alternate airfield, where the weather was better. An extremely complicated situation had taken shape. It had become necessary to land under weather conditions below the minimum acceptable limits for this aircraft, on an icy runway and with a strong crosswind. After the first heavy aircraft set down, its drag parachutes did not deploy. The bomber rolled past the edge of the runway. The tires of the main landing gear were destroyed.

Meanwhile, the weather over the airfield did not improve. Our crew also had to make a landing. Setting down the aircraft almost by the seat of our pants, we released the drag parachutes. We had to jettison them immediately, however. Because of the strong crosswind and the ineffectual braking on the ice-covered runway, the bomber was blown off the runway (a landing on the unimproved runway was impossible, since it was soaked after the autumn rains). Our aircraft also rolled off the runway and ended up alongside the first. We were unable to taxi to the parking area. We decided to leave them where they stopped.

Such was the conclusion of a flight of two crews as a result of an error on the part of the flight control officer who did not fulfil the requirements of the documents that regulated flight operations. Why, then, did this happen?

Having received the report of the duty weather forecaster regarding the approach of precipitation (freezing rain at zero temperatures at ground level), officer Gaydakov did not take measures to insure safety. On the contrary, burning with desire to push his pilots through the rating certification training program, he decided to accelerate the execution of the planning table by reducing the time needed to refuel the bombers. As a result, the fuel reserve on the aircraft proved to be insufficient for flights under instrument meteorological conditions. Thus, the flight control officer himself created the emergency situation and was unable to do anything about it.

Because of the incorrect actions of officer Gaydakov, the potential cause of an air accident emerged. Only because there were experienced instructors among the crews did everything conclude relatively safely.

This example once again confirms the fact that the strict execution of the documents regulating flight operations must be the rule for senior officers of all ranks.

Aviators today carry out flights under instrument meteorological conditions and, as a rule, do not joke around with the weather. However, the violation of the existing rules is quite intolerable. Only under this condition can a high degree of flight safety be guaranteed.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

## ESTIMATION OF BALLISTIC TRAJECTORIES FOR ACHIEVING ORBIT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 42-43

[Article by O. Slavin, candidate of technical sciences: "Launching into Orbit"]

[Text] The solution of a multitude of questions precedes the launching of a spacecraft into orbit. One of these questions is the ballistic calculation of the trajectory.

At that moment when the launch vehicle is on the pad, its altitude and speed relative to the earth's surface are, for all practical purposes, equal to zero. At the moment of insertion into orbit, however, they correspond to certain values of  $H_K$  and  $V_K$  (fig. 1). There exists a multitude of trajectories which seem to connect the initial and final curves describing the rocket's motion. What should be the considerations for selecting the trajectory? In order to clarify this matter, let us examine the interaction of the basic factors which determine the motion of the launch vehicle: the engines' thrust and the earth's atmosphere and gravitational field. We will admit at the outset that we can actively control only the thrust of the rocket motors.

The propulsion system and the fuel load provide the rocket with an enormous reserve of energy and the ability to utilize it within a limited interval of time. With respect to the level of these characteristics, the launch vehicle has no peer among the airborne or seagoing units with which we are familiar. Suffice to say that hundreds of tons of high-performance rocket fuel are expended in 8 to 10 minutes. Such an amount of fuel constitutes more than 80 percent of the initial mass of the rocket. As regards the thrust of the motor in the first stage, it exceeds its initial weight.

The launch vehicle's energy reserve is such that, due to the thrust of the motors (in the absence of other power inputs), the spacecraft can be driven to a velocity of more than 9 km/s. In reality, the craft is driven by the launch vehicle to its first space velocity of 7.8 km/s. The main reason for such a noticeable loss is the earth's gravitational field or, in other words, the attraction of the earth. This constantly operative factor determines to a great extent the shape of the launch trajectory.

The simplest and shortest path to overcoming the earth's gravity, leaving the boundaries of the dense layers of the atmosphere and accelerating to the first space velocity is the vertical ascent. How will it end, however? The craft will rise to

an altitude of several thousand kilometers and will then fall to the earth's surface. This is a natural result, since orbital motion requires not only that the craft be accelerated to its first space velocity, but also that this speed be attained in a horizontal direction.

We will examine another method of launching where the direction of thrust is regulated so that the rocket accelerates as rapidly as possible in a horizontal direction while simultaneously gaining altitude. In this case, great speed will be attained before the rocket exits the dense layers of the atmosphere, which leads to an unacceptable increase in the aerodynamic resistance. As a result, there is an increase in the amount of energy expended in overcoming this resistance. Moreover, the power and thermal loads on the rocket increase, which requires strengthening its design and heat-shielding. The structure of the rocket itself and its systems (without fuel) account for an insignificant portion of its overall weight. The less the weight, the more efficient the rocket system. From this it follows that the rocket is a rather delicate and fragile object, and any increase in the severity of its operating conditions leads to an unavoidable increase in its dry weight, that is to say, to a reduction in the efficiency of the rocket system.

The extreme methods of launching we have examined have proven to be unacceptable. We can now imagine in general terms, however, how the launch should be carried out.

First of all, it is necessary to pass rapidly through the dense layers of the atmosphere at sufficiently slow speeds. This means that the initial segment of the insertion trajectory, when the rocket has yet to attain great speed, must be close to a vertical ascent. A greater and greater portion of the motors' thrust must be directed toward increasing the horizontal component of the velocity in proportion to the increase in flight altitude and the decrease in the density of the atmosphere.

The method we have selected is theoretically correct, but difficulties arise during its realization as well. As the thrust vector turns, the rocket's longitudinal axis deviates from the tangent to the trajectory, and the angle of attack  $\alpha$  (fig. 2) appears. If it is different from zero, the force of the aerodynamic resistance acts both in the longitudinal and lateral directions. In general, however, this "fragile" object is designed for operation with loads along the longitudinal axis. There remains one solution--reduce the lateral loads to an acceptable minimum through the corresponding selection of a program for varying the angle of attack or the direction of the thrust vector.

We will note that when the angles of attack are too small, the direction of thrust slowly rotates from the vertical and the switchover in the expenditure of the rocket's energy to gaining speed in the horizontal direction proceeds just as slowly. In this case, the rocket rather rapidly rises to an altitude at which the density of the atmosphere makes it possible to increase considerably the angle of attack. The speed of the rocket is already so great, however, that its rotation to the horizontal direction requires a considerable expenditure of energy.

We have stated the basic physical considerations that must be taken into account when selecting the launch trajectory. We must also, however, take into account circumstances of an entirely different scheme. We will note only two of them.

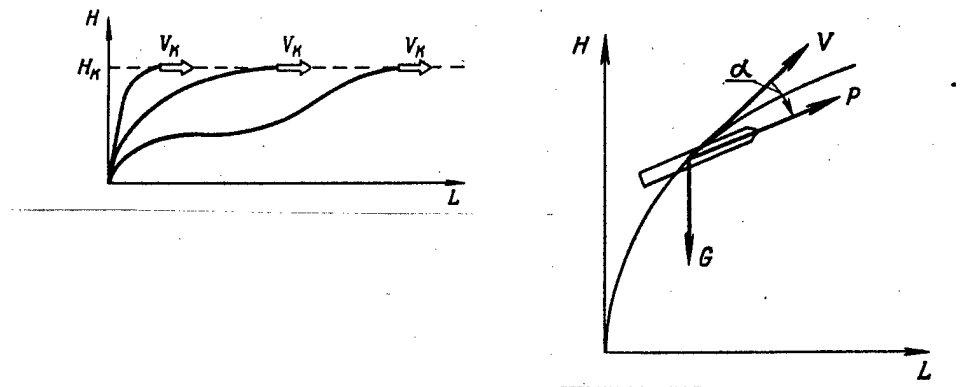


Fig. 1. The series of launch trajectories:  $L$  - distance of this point from the launch site on the surface of the earth over which the spacecraft flies;  $H$  - flight altitude.

Fig. 2. Diagram of forces acting upon the launch vehicle on the launch segment:  $P$  - thrust;  $G$  - weight;  $V$  - speed of the rocket.

In designing the trajectory, it is desirable to find that trajectory which, while satisfying the basic requirements of an launch trajectory, simultaneously insures the delivery into orbit of a payload of maximum mass.

As a rule, a launch vehicle is of multistage design, and all of its components, with the exception of the last stage, fall to earth after they have made their contribution to carrying out the mission of insertion. Consequently, the launch trajectory must be such that the spent portions fall on strictly isolated and prepared regions.

The list of requirements for the launch trajectory could be continued. These requirements are frequently contradictory, while their degree of indispensibility ranges from "desirable wherever possible" to "necessary." The feasibility of realizing these requirements likewise varies. The way out of this situation is the search for an intelligent compromise.

After the selection of the launch trajectory, the process of ballistically calculating the the launch segment is not over. One must still ascertain how reliably the calculations provide for the rocket's necessary curves of motion at the end of the launch.

Mathematical models of the earth's atmosphere and gravitational field and the launch vehicle and its systems are employed in checking the ballistic calculations. Such a calculation provides for the so-called nominal launch trajectory. Can one be assured that the actual launching will follow the nominal trajectory? It will not, of course, since the models used contain either errors in our knowledge about the earth's atmosphere and gravitational field or errors with which any mechanical system operates.

We do know, however, the margins within which these errors occur. In order to obtain more complete knowledge about the possible actual trajectory, we resort to the method of mathematical firings (statistical tests). The essence of this method consists of carrying out the launch calculations many times over, each time using a new set of errors formed at random. Then follows the processing of the results of the calculations by which we judge the possible deviations from the nominal trajectory during the actual insertion.

The guaranteed fuel reserve necessary for successfully launching a spacecraft into orbit is likewise evaluated by the method of statistical modeling. The amount of this reserve is influenced directly or indirectly by many factors, including factors such as the variation in the characteristics of the propulsion system and the fuel itself. With certain combinations of variations, the amount of fuel needed can prove to be greater or less than the nominal reserve. Since it is impossible to guess the specific values of the variations during the actual launch, we must orient ourselves on their most unfavorable combination. In this way, we guarantee that there will be enough fuel in the worst-case situation. Naturally, the guarantee must be reasonable, since additional fuel represents kilograms that are irrevocably taken away from the payload.

Only now, after we have carried out all the calculations, can we say that the ballistic design of the launch trajectory is completed: there is a nominal trajectory; a "tube" of trajectories relative to the nominal beyond the boundaries of which the actual trajectory does not depart; and a known reserve of fuel which guarantees the successful orbital launching of the spacecraft by the launch vehicle.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185



## SATELLITE ORBITS DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 44-45

[Article by Engr-Col V. Gor'kov, candidate of technical sciences: "Satellite Orbits"]

[Text] There is as yet no unified classification providing general characteristics for satellite orbits. In their time, certain specialists, ballisticians in particular, have tried to do so. Their approach to the problem from the strictly theoretical point of view has made it possible to identify certain specific characteristic features of orbits (the stability of these parameters or those, the operating conditions of the apparatus, etc.). The concepts of "stationary," "high-altitude elliptical," "polar" and "solar synchronous" orbits appeared. This article deals with the interrelations between these concepts and the specific purpose of satellites.

The idea of using artificial earth satellites for communication was expressed even before the first satellite was launched. In 1945, for example, the Soviet scientist P. Shmakov suggested using them to organize worldwide television broadcasting.

What attracted scientists to this idea? First of all, there is its simplicity. Tens and hundreds of intermediate retransmitters can be replaced by a single retransmitter raised to a very high altitude over the surface of the earth. This has to be a satellite. Solved at the same time is the problem of providing communications to regions that are inaccessible or separated by seas where retransmitters in the traditional sense cannot be built.

The level of radio-engineering development and the experience accumulated up to that time suggested a simple solution which seemed obvious--utilize the effect of radio-wave reflection. This method of passive retransmission was used time and time again in radar. Despite the simplicity of realization, the economy and certain technical advantages of this method of communication, however, its serious inadequacies were soon discovered. First and foremost was the availability of superpowerful transmitting and supersensitive receiving equipment, the shrinkage of the reflecting shell and the deterioration of its properties and the satellite's short life-span due to the rapid loss of altitude. All of these served as reason at that time to reject the application of the principle of passive retransmission.

One method of utilizing satellites with active radio-signal retransmission enjoyed wide popularity. The essence of this method consisted of the following. Having received signals of frequency  $f_1$  from point A, the satellite amplifies them and retransmits to point B at frequency  $f_2$ . Naturally, it must during that time be on the line of sight of both the transmitting and receiving earth communications stations. This latter point is of considerable significance, for in the absence of an active retransmitter there would not be communications between earth stations, either.

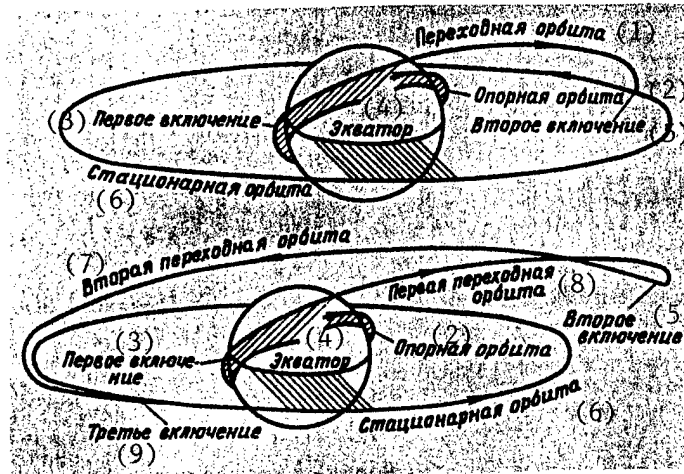
How can one insure one of the most important conditions imposed on communications--its continuity? There exist two mutually complementary methods: the saturation of the orbit with satellites and the increase in their flight altitude. Obviously, the increase in the altitude of the orbit increases the length of time that a single artificial earth satellite can be mutually observed by earth stations. This means that fewer satellites will be required. The visibility in specific regions of the earth is dictated not only by the altitude, but by the inclination of the orbit of communications satellites as well.

The selection of the shape of the orbit (circular, elliptical, high-altitude elliptical), its inclination (polar, inclined, equatorial) and its period of rotation (synchronous, geostationary) is the primary and, one might say, determining factor in designing a satellite communication system. It dictates the system's organizational and operational principles, the power of the radio links and other design considerations.

Satellite communication systems in low, high-altitude elliptical and geostationary orbits have been developed more than other systems. The first to be utilized were low-altitude artificial earth satellites. Their advantages are the low cost of placing them into orbit and simpler onboard equipment. Their shortcomings, however, proved to be more than their advantages: the great number of satellites in the system, the necessity of constantly monitoring their movement and the frequent adjustment to the orbits as a result of their evolution during the process of the flight. All of this led to many operational drawbacks and, in the final analysis, to its unprofitability. Low-altitude satellites proved to be effective only in those cases when two-sided, continuously operating communications were not required (data from geologists, for example). The information to be transmitted is "stored" on board the satellite and is sent down to the earth either automatically or by command when it passes over the site of the receiver.

The development of satellite communication systems in the Soviet Union began with the mastery of high-altitude elliptical orbits. This became possible thanks to the availability of launch vehicles and the increased capabilities of the space port and the command and measurement complex. These made it possible to launch into orbit and control the flight of satellites of the "Molniya" type. These orbits have an inclination of  $65^\circ$ , a period of rotation of 12 hours and altitudes of 40,000 km at apogee and 500 km at perigee.

These parameters were selected because of the condition that the minimum necessary duration of communication had to be insured between the two extreme points. With the aid of the "Molniya" satellite, for example, the simultaneous radio visibility between Moscow and the Far East is maintained over the course of 8 to 9 hours of each 12-hour period.



Two- and three-impulse systems for launching satellites into geostationary orbit.

Key:

- |                   |                          |
|-------------------|--------------------------|
| 1. Transfer orbit | 6. Stationary orbit      |
| 2. Base orbit     | 7. Second transfer orbit |
| 3. First firing   | 8. First transfer orbit  |
| 4. Equator        | 9. Third firing          |
| 5. Second firing  |                          |

How is this achieved? It is accomplished, first of all, by considering the laws of mechanics and perturbation. For example, in accordance with Kepler's Second Law, a satellite's angular velocity when moving along an elliptical orbit decreases with respect to its distance from the center of the earth. In other words, its speed of motion in the region of the apogee is considerably less than at the perigee. This makes it possible to achieve such a duration of communications when the satellite's apogee is situated in the Northern Hemisphere. This is a necessary, but insufficient, condition. The fact of the matter is that perturbations induced by the shape of the earth lead to a precession of the apsidal line (the line connecting the orbit's apogee and perigee). This being the case, the major influence on the rate of precession proves to be the degree of inclination. An analysis of the mathematical relations describing the motion of satellites in an actual field of forces makes it possible to find among the multitude of orbits that one for which the precession is equal to zero. Its inclination proves to be approximately 63 degrees. Geostationary orbits are even more suitable for communications.

We know that it is quite impossible to create an artificial satellite which would remain motionless in interplanetary space. It can, however, be launched into orbit in such a way that, rotating with respect to the stars, it remains motionless for the observer on earth. Such a satellite is commonly referred to as geostationary--motionless relative to some point of the earth's surface. What, then, must be the orbital parameters for such a satellite?

It is assumed that the earth completes one revolution relative to its axis in 24 hours. This is only partly true. The meridian on which Moscow is located, for example, actually intersects the line between the earth and the sun every 24 hours. Relative to the direction to a stationary star, however, it completes revolution in only 23 hours, 56 minutes and 04 seconds. Thus, in order for a satellite to rotate synchronously with the earth, it must make one revolution about the axis of the earth in that period of time. Not every synchronous satellite will be stationary, however. In order for it to appear motionless to an observer on the earth, the plane of its orbit must be perpendicular to the earth's rotational axis. Under these conditions, there remains one naturally feasible orbit, the path of which passes over the equator. This means that its angle of inclination is equal to zero. The altitude of its orbit must be 35,800 km.

This orbit is good, because the satellite "sees" 40 percent of the earth's surface. This is why the number of geostationary satellites increases yearly, primarily for communications. This orbit has already become crowded. Moreover, the spacecraft are already starting to age and cease working. What is to be done? Indeed, a new spacecraft will have to be put in the place of one that wears out.

This is where the earth once again comes to our assistance. A satellite which has ceased working almost imperceptibly begins to move along its orbit. For the satellite there are two regions, the so-called "potential wells," which a satellite, once having fallen into, stops like a ship that has thrown out the anchor. The difference is that the seagoing vessel can weigh anchor, while the spacecraft cannot get out of the "potential well." Here it will remain forever. The regions where satellite drift is absent coincide with the minor axis of the equatorial section of the earth and are located over the Indian and Pacific Oceans.

Geostationary satellites are most simply launched into orbit from launch installations situated along the equator. Here is the reason why: in the general case, one must resort to rotating the plane of the orbit during the insertion process. For a flight to the moon from the territory of the USSR, for example, less fuel is required than for a launch of a satellite into stationary orbit, despite the fact that the latter is more than ten times closer to our planet. Of all the energy expended on the launch, approximately one-half goes toward rotating the plane of the orbit. This is why the equator is considered the best location for launching satellites.

Two- and three-impulse systems are commonly used to launch satellites into geostationary orbits. In both cases, the satellite is tentatively inserted into a circular staging orbit along with the last stage of the launch vehicle at an altitude of approximately 200 km and remains in that orbit awaiting a favorable time for the maneuver.

The rocket motor is fired for the first time to shift the satellite from the parking orbit to a transfer orbit whose apogee touches the stationary orbit and whose perigee touches the parking orbit. This being the case, the firing of the rocket motor must coincide with the time the satellite intersects the equator, while the duration of the flight must insure that it is placed into the desired point of the stationary orbit. When the satellite passes the apogee, the rocket motor is fired a second time to rotate the plane of the transfer orbit and raise the perigee to the altitude of the stationary orbit. After the rocket motor stops operating, the satellite separates from the launch vehicle. Such is the two-impulse system for inserting a geostationary satellite into orbit.

If you were to ask any person if it would be expedient to fly on an aircraft from Moscow to Kiev by way of Vladivostok, he would undoubtedly think that you were joking with him--such a roundabout maneuver is associated with a tremendous and unnecessary expenditure of fuel. Things are different in space, particularly when inserting a satellite into a geostationary orbit. A three-impulse system will be more preferable for launching pads located above  $49^\circ$  latitude. As in the first case, the satellite is shifted from the parking orbit into a transfer orbit, but with an altitude for the apogee greatly exceeding that of the stationary orbit. The motor is fired a second time at the apogee in order for the satellite to enter the next transfer orbit. This orbit is already located in the plane of the equator and its perigee touches the stationary orbit. The motor is fired for the third time at the perigee of the second transfer orbit (that is, at the altitude of the stationary orbit) in order to reduce the speed of the satellite and prevent it from going higher. As a result, the satellite ends up at the planned point in the stationary orbit. As paradoxical as this may seem at first glance, it is this utilization of a transfer orbit with an apogee greatly exceeding that of the stationary orbit that provides the energy payoff. As it turns out, the energy expenditure in rotating the plane of the orbit (the determining factor in the overall share of fuel expenditures) decreases as the altitude increases. As a result, the scheme becomes more economical.

Naturally, the schemes we have presented are not the only ones. Others are also possible, depending upon the situation and the specific conditions.

(Conclusion follows)

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO: 9144/0185

# AVIATSIYA I KOSMONAVTIKA : ANNUAL INDEX--1982

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 82 (signed to press 2 Nov 82)  
pp 46-47

## Contents

## Issue

### Official Materials. Editorials

Address of the CPSU Central Committee, the Presidium of the USSR Supreme Soviet and the USSR Council of Ministers of the Communist Party and the Soviet People. . . . .	12
Informational Report of the Plenum of the CPSU Central Committee . . . . .	12
Speech of Comrade Yu. V. Andropov. . . . .	12
Speech of Comrade K. U. Chernenko. . . . .	12
Ukase of the Presidium of the USSR Supreme Soviet on the Awarding of Honorary Titles 'Meritorious Military Pilot of the USSR' and 'Meritorious Military Navigator of the USSR'. . . . .	10
Flight Safety--A Party Concern--L. Batekhin . . . . .	4
The Union Indivisible--L. Batekhin . . . . .	12
To Improve the System of Flight Control--S. Golubev. . . . .	3
The School of Combat Mastery--S. Golubev . . . . .	6
Military-Training Institutions of the Air Force at the Present Stage--G. Dol'nikov . . . . .	1
To Augment the Traditions of the Front-Line Soldiers with Excellent Training--A. Yefimov. . . . .	5
A Reliable Defense for Peaceful Labor--P. Kutakhov . . . . .	2
Inspired by the Party--P. Kutakhov . . . . .	8
Our Basic Law . . . . .	10
The Mighty Stride of October--V. Reshetnikov . . . . .	11
The Training of Command Personnel--N. Skomorokhov . . . . .	9
Discipline of an Aviation Specialist--V. Skubilin . . . . .	7

### Political and Military Education

Ideologically Tempered--L. Amiryan . . . . .	3
An Uneasy Position--N. Antonov. . . . .	2
Aiming for the Heights--N. Antonov . . . . .	7
On the Experience of the Vanguard--Yu. Belyayev . . . . .	1

At the Command Post of the Chief of Staff--Yu. Belyayev . . . . .	3
The Fighting Man's Nature--Yu. Belyayev. . . . .	6
The Optimum Solution--Yu. Belyayev . . . . .	9
The Takeoff Trajectory--Ye. Besschetnov. . . . .	8
Taking the Proven Road--Ye. Besschetnov. . . . .	11
According to the Behests of the Leader--A. Bublik . . . . .	9
The Chief Criterion of Quality--G. Vasil'yev . . . . .	10
Forming a Combat Attitude--I. Vasil'yev. . . . .	5
By the Long Routes--I. Vakhnov. . . . .	1
The Year of Great Accomplishments. . . . .	11
The Job Obliges--A. Golubchik . . . . .	12
"He Acted As He Should"--G. Gubanov . . . . .	8
New Landmarks in Party Work--P. Dragovoz . . . . .	7
With an Inviting Word--I. Drobinka . . . . .	1
Discipline of the Communist--I. Zhabin . . . . .	8
From Heart to Heart--V. Zdanyuk . . . . .	4
A Person of High Duty--V. Zdanyuk. . . . .	9
To Educate the Worthy--A. Znamenskaya . . . . .	9
The Work of the Trade Unions--To a New Phase!--V. Zuyev . . . . .	6
When the Word Calls--I. Ivanov. . . . .	8
For the Good of the Man--I. Ivanov . . . . .	10
Light Inversion--L. Isakov . . . . .	3
The Squadron Maintains Altitude--L. Isakov. . . . .	9
High Vigilance, Constant Combat Readiness--Ye. Kabanov. . . . .	5
Closeness to the People--V. Kas'yanov . . . . .	8
Constant Concern for Air Force Personnel--L. Klochikhin . . . . .	11
Reserves for Self-Education--V. Korobeynikov . . . . .	9
Concern About the Lieutenants--I. Kostash . . . . .	4
A Defense Against Losses--K. Krepskiy . . . . .	9
The Military Relay--A. Kuznetsov . . . . .	1
For High Industriousness and Militancy--V. Kuzovov . . . . .	2
The Graduate Arrived at the Unit--V. Kurochkin . . . . .	10
Behind Every Letter Is a Person--Yu. Lan'shin. . . . .	9
With Thoughts of the Motherland--A. Lapshin . . . . .	4
Loyalty to the Wing--V. Lebedev . . . . .	2
Orlov's Sky--V. Lebedev . . . . .	5
On the Precipice--V. Lebedev . . . . .	11
Efficient, Lively, Interesting--V. Magerya. . . . .	7
Strengthening the Discipline of Execution--V. Mazur. . . . .	1
High Effectiveness for Ideological Work--V. Makeyev. . . . .	10
Something To Take to the People--A. Malinin . . . . .	3
Introducing What Is New and Progressive--F. Maseyev. . . . .	11
The Crew--One Family--S. Miroshnichenko. . . . .	2
In Close Contact with Life--S. Mikhaylov . . . . .	10
When Help Is Specific--Ye. Moskal' . . . . .	3
It Is Our Common Concern--A. Nagornyak and V. Alloyarov . . . . .	4
Loyalty to the Word--V. Obukhov . . . . .	6
Listening to the Song of the Turbines--I. Onishchenko . . . . .	4
Selection of the Route--I. Onishchenko . . . . .	9
With the First Missile . . . . .	6
"Responsive to People, Reliable on the Job"--O. Podryadchikov . . . . .	1

The Main Point of Reference--O. Podryadchikov . . . . .	5
The Aerial Gunner's Medal--Yu. Polezhayev . . . . .	7
Inspiration--S. Reutov . . . . .	5
Constantly, Effectively--A. Ryabov . . . . .	6
The Right To Lead--G. Ryabokon' . . . . .	1
In Carrying out the Duty--G. Ryabokon' . . . . .	10
Continuing the Glorious Traditions--G. Ryabokon' . . . . .	12
By Duty and Calling--I. Svetlichnyy . . . . .	6
Exactitude and Discipline--A. Singayevskiy . . . . .	3
Authority of the Political Worker--V. Sinyakov . . . . .	2
Competition and Combat Readiness . . . . .	12
A Line in the Recommendation--G. Spiridonov . . . . .	7
The Sky Is Part of Them--N. Stupnev . . . . .	11
Always Among the People--A. Sul'yanov . . . . .	12
Brothers--V. Teteryatnik . . . . .	10
The Ideological Tempering Grows Stronger--Yu. Trushchev . . . . .	1
The Need To Create--G. Chaplygin . . . . .	8
With Creative Enthusiasm--N. Chebotayev . . . . .	11
The School of Communism . . . . .	3
The Chief Navigator--A. Yudenko . . . . .	5

#### Military Historical and Military Political Articles

Progress in Aviation--M. Mishuk . . . . .	6,7
Troop Support in the Offensive--I. Palashevskiy . . . . .	6
Long Range Aviation--V. Reshetnikov . . . . .	3
A Letter to the Leader--L. Shishov . . . . .	4
Chronicle of the Great Life--L. Shishov . . . . .	12

#### For High Combat Readiness

Is It Only a Matter of Carelessness?--V. Aksenov . . . . .	2
Flying and Combat--V. Andreyev . . . . .	8
Accuracy from Takeoff to Landing--Ye. Antonov . . . . .	6
Twice as Reliable--A. Belkin . . . . .	8
Only a Pair--M. Bobrov . . . . .	8
Instructiveness for Flight Critiques--A. Bakulenko . . . . .	4
The Pair--The Primary Tactical Subunit--Yu. Vetrov . . . . .	6
The System Warns the Pilot--M. Vinogradov . . . . .	4
Helicopters Land Airborne Troops--V. Gnezdenev . . . . .	12
The Future Beyond the Pair--D. Goldyrev . . . . .	4
The More Accurate the Weather Forecast--A. Golovchenko . . . . .	12
With a Consideration for the Combat Missions--S. Golubev . . . . .	11
The "Projector-Target" Device--S. Griбанov . . . . .	1
The Pair's Strength Is in Its Tactics--A. Dashin . . . . .	5
The Command Post Controls the Battle--I. Dmitriyev . . . . .	2
In the Sky and Alone--A Soldier!--V. Dokuchayev . . . . .	8
With an Evasive Manuever--G. Druzhinin . . . . .	2
An Important Link--A. Yevlanov . . . . .	4
"He Merits the Highest Mark"--A. Yena . . . . .	10
No Allowance for Youth--V. Zhavoronkov . . . . .	2



Both the Pair and the Single--A. Zheltikov . . . . .	7
On the Firm Basis of Regulations--R. Zenchenko . . . . .	9
Tactical Training of the Airman--V. Dokuchayev . . . . .	5
A Comrade Will Assist in Misfortune--V. Kazakov . . . . .	9
Altitude on the Flight Recorder Tape--M. Kanarskiy . . . . .	6
Predicting the Situation in Combat--V. Karyakin . . . . .	3
Within the Power of a Single Person--V. Kachanov . . . . .	9
What Training Has Shown--E. Kozlovskiy . . . . .	3
Into the Air Through the Trainer--E. Kozlovskiy and L. Drach . . . . .	6
A Collective Educator--P. Korchemnyy . . . . .	11
Haste Makes Waste--A. Krasnov . . . . .	9
A Comrade Needs Support--V. Kryuchkin . . . . .	8
Our Flight Commander--N. Kuzyak . . . . .	11
Group--Take Off!--A. Lapshin . . . . .	7
Two Squadrons Compete--A. Lapshin . . . . .	10
And the Tanks Attacked--P. Lichagin and A. Lapshin . . . . .	11
The Enemy Did Not Pass--V. Moshkov . . . . .	2
The Shield and Sword--S. Murav'yev . . . . .	7
Helicopters Over the Battlefield--B. Nesterov . . . . .	7
The Voice of One Man Is the Voice of No One--L. Nikitovskiy . . . . .	8
And Still a Pair!--V. Opalyuk . . . . .	10
Calculation in the Mind--A. Pesterev . . . . .	7
How To Put The Question--A. Plentsov . . . . .	10
Plus Navigator Training for the Crew--V. Polonskiy . . . . .	1
Validity of the Commander's Decision--V. Selivanov . . . . .	10
Ground Speed with the Help of the On-Board Radar Navigation System--V. Solov'yev . . . . .	3
The Mission Is Received in the Air--N. Stremous . . . . .	1
Wind Shear. Its Causes and Consequences--D. Finogeyev . . . . .	2
To Foresee the Combat Situation--D. Folomeyev . . . . .	8
If Execution Is Low--F. Fomichev . . . . .	3
The Systems Approach--V. Shishkin . . . . .	1
In Close Contact--Ye. Shpits . . . . .	8
And This Is What I Think--I. Yankovskiy . . . . .	8

#### On Practical Aerodynamics for the Pilot

Assessing Flying Errors--S. Bytko . . . . .	3
Recovery from a Rising Maneuver--S. Bytko . . . . .	4
Maneuvering in Formation--S. Bytko . . . . .	5
Before Aerial Combat--S. Bytko . . . . .	6,7
Near the Stall Limit--V. Zhulev, G. Federenko and N. Kurnyavtsev . . . . .	11
Secondary Flight Conditions and Stability at Speed--N. Lysenko . . . . .	2
Try To Solve. Compare Your Solutions . . . . .	1-6, 8-12

#### Engineer Aviation Support for Combat Training and Matters Regarding the Air Force Rear Area

Aviation Maintenance Specialists Compete--A. Antonov . . . . .	5
Who Will Teach the Supervisors of Technical Maintenance Units?--Ye. Aparin . . . . .	6
Care for Filters in On-Board Radar Systems--F. Ayupov and O. Mikhedov . . . . .	3
Creative Daring of the Innovators--V. Bachin . . . . .	10

Search for the Thrifty--N. Burtyshev. . . . .	9
Life and Combat Readiness . . . . .	9
At the Mountain Airfield--O. Gugnivenko. . . . .	10
They Forgot To Adopt It--A. Guk . . . . .	6
For Every Family . . . . .	5
Performance and Failure--V. Kapranov. . . . .	6
Parameters of Reliability--F. Kozlov. . . . .	3
In the Transition Period--L. Kudryashov. . . . .	3
In the New Position--V. Lebedev . . . . .	8
New Goals for the Air Force Rear Services--V. Loginov . . . . .	8
What Did the Critique Provide?--A. Mayorov. . . . .	6
An Innovator Made a Suggestion--A. Makarov. . . . .	1
Innovators Can Do Much--A. Makarov . . . . .	7
The Aircraft Are Based in the Mountains--A. Malashko . . . . .	12
Specialists from the Technical Maintenance Unit Compete--M. Novikov . . . . .	9
An Aircraft Arrived at the Technical Maintenance Unit--Yu. Pogrebnyak. . . . .	7
Takeoff in Any Weather--Ye. Polezayev and V. Panchenko. . . . .	3
The Engineer's Personal Plan--S. Sarnovskiy . . . . .	2
The Initiative of the ATO Duty Officer--Yu. Sopin . . . . .	4
One Only Has To Break a Lance--M. Stasovskiy . . . . .	5
So That the Unit Would Not Fail--S. Stepanov . . . . .	3
Effectiveness of the Training Hour--I. Strizhanenko. . . . .	8
The Creative Contribution of Young People . . . . .	7
Operating Equipment According to Its Condition--A. Tikhomirov . . . . .	2
The Wings of Initiative Grow Stronger--A. Tkachev . . . . .	1
"I Trust in the Group"--V. Usol'tsev. . . . .	3
The Flight Technician--V. Fadeyev. . . . .	1
The Technician Returned from Leave--V. Khodyrev . . . . .	9
The Work Attitude Explains It--G. Chaplygin . . . . .	1
The Depth of the Search--V. Shamshin. . . . .	1

## Flight Safety

The Accident Was Avoided, However...--Yu. Andronov . . . . .	8
The Flight Control Officer Was Distracted--D. Baynetov. . . . .	5
Landing with the Gear up--A. Berezin. . . . .	1
He Did Not Heed the Warning--G. Vishnevskiy . . . . .	12
The Weather Service--D. Volodin . . . . .	1
The Trustworthiness of Ornithological Forecasting Grows--V. Grabov. . . . .	3
The Range and the Zones Were Vacated--A. Guk . . . . .	11
The Forecast Proved Not To Be True--Ye. Davydov . . . . .	6
When the Situation Became Complex--S. Oskanov, I. Appatov and A. Lastovetskiy . . . . .	5
They Temporarily Lost Their Bearings--V. Pekshev. . . . .	9
They Reported: "Everything Is in Order"--V. Podarov. . . . .	10
In the Snowy Vortex--N. Potapov . . . . .	10
Teaching Aggressiveness in Combat--A. Sigilev. . . . .	12
People Don't Play with Fire--V. Tkachenko . . . . .	7
"Rely on the Navigator"--V. Usol'tsev . . . . .	7
"I Forbid the Drop!"--A. Yudenko . . . . .	8

## From Life at Institutions of Higher Learning

Unused Reserves--V. Knyazev. . . . .	8
Tactical Training of Cadets--A. Konovalov and O. Basmanov. . . . .	7
Air Force Institutions of Higher Learning Extend an Invitation . . . . .	2-6
Independent Work of the Cadets--Ye. Savvin. . . . .	8
The Instructor's Authority--V. Sytyanov. . . . .	11
The Instructor's Experience--A. Tokarev. . . . .	5
He Believed in Himself--P. Troshin . . . . .	3
At the Basis--A Scientific Approach--V. Shabanov. . . . .	10
Command Skills for Each Graduate--A. Shlykov and V. Kurochkin . . . . .	6

## Cosmonautics and the Economy

"Salyut-7"--A. Aleksandrov . . . . .	9
Space Antennas--V. Andreyev and V. Shagov . . . . .	3
Radio Control of the Orbit--V. Andreyev. . . . .	5
The First Space Rocket--V. Burdakov . . . . .	2
In the Classroom, in the Air and in Orbit . . . . .	7
"Salyut-7" in Flight . . . . .	6
In Search of a Spaceport--V. Gor'kov. . . . .	8
Satellite Orbits--V. Gor'kov . . . . .	12
A Library in Orbit--Yu. Grikhanov. . . . .	6
The Road into Space . . . . .	4
Satellite Surveying--V. Yegorov . . . . .	6
Among Our Vietnamese Friends--V. Yegorov . . . . .	9
An Example of Fruitful Cooperation--S. Yegorov . . . . .	9
"Salyut-7": The Second Expedition of the Visit--S. Yegupov . . . . .	10
Flight at Low Thrust--V. Ivanov . . . . .	2
To Meet the Morning Star--N. Ivanov . . . . .	5
To See the Invisible--G. Irigin . . . . .	7
Idealism, Mastery, Courage--P. Klimuk and S. Yegupov . . . . .	2
Cooperation in Space--V. Kozyrev . . . . .	6
The "Meteors" Stand Watch--N. Kon'yukov. . . . .	11
Orbits of Peace and Progress--V. Kotel'nikov . . . . .	11
In the Interests of Cooperation--V. Kotel'nikov . . . . .	12
Space Photography--V. Kuchumov. . . . .	1
Space Should Be Peaceful--O. Lomov . . . . .	7
In the Zone of Visibility--Yu. Luk'yanov . . . . .	9
Among Our Bulgarian Friends--V. Lyndin . . . . .	1
The "Kosmosy" Serve the People--V. Lyndin . . . . .	3
Among Our Hungarian Friends--V. Lyndin . . . . .	8
A Grateful Word from Gagarin--V. Mel'nikov. . . . .	4
The "Veneras" Study Venus--Yu. Nikolayev . . . . .	5
Satellite Guidance--V. Olimpov and G. Irinin . . . . .	6
At That Starry Hour--B. Pokrovskiy, A. Brykov and Ye. Atachkin . . . . .	10
Orbits of Friendship--M. Rimsha . . . . .	4
Insertion into Orbit--O. Slavin . . . . .	12
On the Path to Space Flights--V. Slavyantsev . . . . .	9
Space Transformations--V. Syromyatnikov. . . . .	8
Table of Space Launches in the USSR in 1981 . . . . .	4

Exploratory Spacecraft of Yesterday and Today--G. Tamkovich . . . . .	10
Two Approaches to One Problem--A. Timofeyev . . . . .	2
The Astral Orbits of October--G. Titov . . . . .	12
The UN Commission on Space--L. Tkachev . . . . .	6
The Strides of Manned Space Travel . . . . .	10
The Crew of the "Soyuz T-5". . . . .	7

#### Science in Service to the Motherland

Dirigibles of the Past and Future--I. Belichko . . . . .	2
Powder Metallurgy in Aircraft Construction--Ye. Ivanov. . . . .	8
Metals of the Space Era--N. Kon'kov . . . . .	1
The "Sokol'niks" Extend an Invitation--S. Mironov . . . . .	7
Along the Flight Routes of Aeroflot--B. Panyukov. . . . .	2
On an Airplane with Rocket Boosters--O. Petrovich . . . . .	4
International Aeroflot--I. Platonova. . . . .	9
Scientist and Researcher--A. Ponomarev . . . . .	1
A Talented Aircraft Designer--A. Ponomarev. . . . .	10
Mystery of the Brass Pipe--V. Serdyukov. . . . .	8
With a Pressure Suit--A. Solodovnikov . . . . .	1
The USSR VDNKh in the Jubilee Year--Ye. Shapochkin . . . . .	4

#### Years, People, Deeds

In the Fiery Ring--A. Ageyev . . . . .	11-12
We Must Not Forget the Days at the Front--A. Akvilyanov . . . . .	8
In the Fiery Sectors--N. Andreyev. . . . .	1
Mozhayskiy's Creative Feat--N. Antonov . . . . .	4
Answer, Fedor!--N. Arkhipov. . . . .	6
Assistance at the Front--V. Barsukov. . . . .	11
Uneasy Nights--N. Biryukhov. . . . .	4
They Loved the Technicians as Brothers--A. Borozheykin. . . . .	9
Two Memorable Battles--P. Golovin. . . . .	3
An Hour Before Dawn--A. Grigor'yev . . . . .	1
They Emerged Victors--N. Gubin. . . . .	8
In Defiance of Death--I. Gusev. . . . .	3
Into Pitched Attacks--I. Gusev. . . . .	8
What the Photograph Told--I. Gusev . . . . .	12
Loyalty to Duty--P. Gus'kov. . . . .	12
The "Soviet Georgia" Squadron--S. Davtyan . . . . .	7
Chernyanka. July of Forty-Three--N. Yel'shin . . . . .	2
He Did Not Return to the Airfield--A. Zhuravlev . . . . .	2
They Got as Close as They Could--A. Zhuravlev. . . . .	5
A Photograph of Particular Importance--B. Zelichenko . . . . .	5
Through All Trials--N. Il'in . . . . .	1
From the Tribe of the Winged--M. Kadet . . . . .	1
Front-Line Resourcefulness--N. Kaplunovskiy . . . . .	10
A Particularly Important Mission--A. Karpov . . . . .	2
Under the Wing of Tosno and Mog--S. Kozel'kov. . . . .	9
"We Are Attacking the Tanks"--A. Kopeykin . . . . .	6
The Ground Rushed Up To Meet Them--G. Korabel'skiy . . . . .	1
The Pilot-Innovator--Ye. Koroleva. . . . .	11

On the Wave of Victory--Ye. Koyander. . . . .	5
By the Method of Demonstration--V. Kurochkin . . . . .	5
They Called the Regiment Komsomol--V. Makarov. . . . .	12
"He Took Vengeance on the Enemy in Full"--V. Mansurov . . . . .	4
Carrying Life on Wings--D. Mel'nik . . . . .	7
Wings of Great Initiative--S. Mikhaylov. . . . .	8
Striking Attacks--B. Monastyrskiy. . . . .	1
Over the Volga Stronghold . . . . .	10
In Their Personalized Yak's--B. Nalivayko . . . . .	12
The Commissar Led Them into Battle--B. Nikitin . . . . .	12
With the Assault Troops on Board--V. Peresvetov . . . . .	4
The "Old Men" Went into Battle--V. Popkov . . . . .	2
The Party Organizer Went on Ahead--I. Roshchin and N. Shakhmagonov. . . . .	4
In the Sky over the Don--K. Ryabov . . . . .	12
Holders of the Order of the Fatherland--N. Savichev. . . . .	5
On Decorations, the Names of Military Leaders--N. Savichev . . . . .	7
The Pilots Said: "Thank You!"--T. Sadovko . . . . .	5
Corps Commander Smushkevich--I. Svetlichnyy . . . . .	9
Thus Fought the Girls--G. Spiridonov. . . . .	4
According to the Laws of Life at the Front--V. Suravenkov. . . . .	5
Pokryshkin's School--K. Sukhov. . . . .	10-11
A Man as Old as the Great October Revolution--V. Khromin . . . . .	11
How Young We Were--A. Chizhenova . . . . .	3
They Fought in the Safonov Way--Ye. Shkurko . . . . .	7

#### Your Health

Toward Flying Longevity--R. Kadyrov and A. Volkov . . . . .	1
A Charge of Good Spirits--R. Makarov and M. Lobzha . . . . .	3
In Friendship With Sport--V. Nizhnik. . . . .	6

#### Flight and Psychology, On Moral Themes

The Missed Approach--Ye. Gorbunov. . . . .	4
The Assistant Replaced the Commander--A. Dolgikh. . . . .	6
To Keep the Dream From Dying--V. Drozdov . . . . .	7
A Tight Spiral--G. Ivanov . . . . .	5
On the Advice of a "Kind" Uncle--V. Kurochkin. . . . .	3
By Eye, But Accurate--N. Litvinchuk and V. Kozlov . . . . .	9
"I Will Not Remain Indebted"--Yu. Polezhayev . . . . .	3
Psychological Crew Compatability . . . . .	12
What Makes the Family Strong?--V. Trifonov . . . . .	9
The Report--V. Usol'tsev. . . . .	5

#### Abroad

The "Assault Breaker" System--V. Romanov . . . . .	1
Dangerous Targets, Worthless Methods--I. Svetlichnyy . . . . .	11

## Criticism and Bibliography

With the Birth of Aviation--N. Zavalova. . . . .	7
Myth and Reality--A. Lamkov. . . . .	4
The Fighters Attack--V. Levitskiy. . . . .	5
Theory of Rocket Motors--V. Leonidov. . . . .	8
In the Name of Victory--O. Lobastov and B. Sarapas . . . . .	7
On Religion and the State--I. Svetlichnyy . . . . .	2
A Heroic Deed on Moscow Soil--I. Svetlichnyy . . . . .	3
In the Interest of All Fronts--V. Sokolov . . . . .	7
On Those Who Are Ahead--V. Sokolov . . . . .	12
The Legendary 18th--N. Shakhmagonov . . . . .	9
Miscellaneous Shorts . . . . .	1, 5-7, 9
Bookshelf. . . . .	1-12
Foreign Aviation and Space Information . . . . .	1, 2, 5-8, 10, 12

COPYRIGHT: "Aviatsiya i kosmonavtika", 1982

9512

CSO:9144/0185

END